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draft environmental impact statement
cumulative impacts of mining

YUKON–CHARLEY RIVERS

NATIONAL PRESERVE / ALASKA

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March 3, 1849

United States Department of the Interior
NATIONAL PARK SERVICE
ALASKA REGIONAL OFFICE
2525 Gambell Street, Room 107
Anchorage, Alaska 99503-2892

IN REPLY REFER TO:

Dear Reader:

The accompanying Draft EIS (DEIS) for mining in certain national park system units in Alaska evaluates four alternatives for managing mining activity, analyzing cumulative effects, and mitigating environmental impacts.

The U.S. District Court for Alaska, in Civil Case J85-009, required the National Park Service to prepare environmental impact statements that study the cumulative effects of mining in three park units: Denali National Park and Preserve; Wrangell-St. Elias National Park and Preserve; and Yukon-Charley Rivers National Preserve. This DEIS was prepared in response to the District Court requirement, and the need to evaluate the minerals management program for these Alaska national park system units.

Any individual, group, organization, or government agency with an interest in the findings of this DEIS may comment during the public comment period. The comment period is for 60 days and begins on the day the DEIS notice of availability is published in the Federal Register. Written comments should be submitted to: Steven Hunt, Project Coordinator, Minerals Management Division, National Park Service, Alaska Regional Office, 2525 Gambell Street, Anchorage, Alaska 99503. Comments may also be presented at public hearings scheduled during the comment period. The times and places of public hearings will be published in the Federal Register and announced in newspapers and through other news media. The Final Environmental Impact Statement (FEIS) will reflect changes resulting from public comment on the DEIS and will also be available to the public.

Sincerely,

Boyd Evison
Regional Director

DRAFT ENVIRONMENTAL IMPACT STATEMENT

MINING IN YUKON-CHARLEY RIVERS NATIONAL PRESERVE

ALASKA

Lead Agency:	**National Park Service** **U.S. Department of Interior**
Cooperating Agencies:	**Fish and Wildlife Service** **U.S. Department of Interior**
	Corps of Engineers **U.S. Department of Army**

This draft environmental impact statement assesses the cumulative impacts of multiple mining operations in Yukon-Charley Rivers National Preserve as required by the U.S. District Court's (District of Alaska) final judgement and injunction of March 3, 1988 (Civil Case J85-009). Four alternatives were evaluated for managing mining activity, analyzing cumulative impacts, and mitigating environmental impacts in Yukon-Charley Rivers National Preserve. The proposed action, alternative B, includes the review of mining activities under existing authorities and regulations with an emphasis on a quantitative approach for reviewing proposed mining plans of operations and assessing cumulative effects. Alternative A (post-1985 status quo/no action) includes the review of mining activities under existing authorities and regulations with an emphasis on a qualitative approach for reviewing proposed plans of operations and assessing cumulative effects. Alternative C is identical to the proposed action but also includes patent restrictions for new mineral patents and a strengthened mining claim acquisition program. In alternative D, all patented and valid unpatented mining claims are acquired and future mining is discontinued entirely in Yukon-Charley Rivers National Preserve. The alternatives were analyzed for impacts on park resources including wetlands, aquatic resources, wildlife resources, threatened and endangered species, visual quality, cultural resources, subsistence, recreation and visitor use, wilderness values, local economy, and paleontological resources.

For further information contact: Floyd W. Sharrock, Chief, Minerals Management Division, National Park Service, Alaska Regional Office, 2525 Gambell Street, Anchorage, AK 99503 (907-257-2616)

SUMMARY

A range of alternatives for managing mining activity, analyzing cumulative impacts, and mitigating environmental impacts in Yukon-Charley Rivers National Preserve are evaluated herein. Four alternatives, including a proposed action, are listed below.

> Alternative A (post-1985 status quo/no action) - review and analyze mining proposals using a qualitative evaluation of cumulative effects
>
> Alternative B (proposed action) - review and analyze mining proposals using a quantitative evaluation of cumulative effects and resource protection goals
>
> Alternative C - review and analyze mining proposals using a quantitative evaluation of cumulative effects and resource protection goals with the addition of patent restrictions for mining claims patented in the future and a strengthened mining claim acquisition program
>
> Alternative D - acquire all patented and valid unpatented mining claims

On July 22, 1985, the U.S. District Court for the District of Alaska enjoined the National Park Service (NPS) from approving plans of operations for mining in three national park system units. The court order resulted from litigation filed by the Northern Alaska Environmental Center, Alaska Chapter of the Sierra Club, and Denali Citizens Council (Civil Case J85-009). The court order directed the National Park Service to ensure full compliance with the National Environmental Policy Act (NEPA)(PL 91-190) and the NPS regulations for mining and mining claims (36 CFR Subpart 9A) before taking actions to approve new mining operations in park units. The court also required the National Park Service to prepare adequate environmental impact statements covering the cumulative effects of multiple mining operations in Wrangell-St. Elias National Park and Preserve and Yukon-Charley Rivers National Preserve. On December 4, 1985, this order was amended to require the preparation of an additional environmental impact statement for mining in Denali National Park and Preserve. A final judgement and injunction were issued on March 3, 1988.

This Draft Environmental Impact Statement was prepared in response to the court order. It addresses the cumulative effects of mining associated with managing mining activity, analyzing cumulative impacts, and mitigating environmental impacts in the Woodchopper/Coal/Sam Creek and Fourth of July Creek study areas of Yukon-Charley Rivers National Preserve. This action coincides with the need to evaluate the minerals management program in the Yukon-Charley Rivers, Wrangell-St. Elias, and Denali NPS units to provide for adequate resource management and protection and is one element of a minerals management plan.

In developing the draft report, numerous issues are identified that require analysis. These issues include hydrologic changes, water quality, impacts on wetlands, long- and short-term impacts, nonmining uses of patented claims, reclamation, fish and wildlife habitat, threatened and endangered species, criteria for cumulative effects analysis, impact thresholds, magnitude of impacts, economic impacts, access, impacts of access, impacts on subsistence, heavy metals contamination, abandoned mine lands, impacts on scenic values, administrative costs for mining claims, acquisition costs of mining properties, and wilderness. For purposes of analysis, a mineral development scenario was developed and applied uniformly across the range of alternatives to project environmental impacts. The scenario predicts where and to what extent future mining activity might reasonably occur in the park over the next 10 years. The scenario neither represents an NPS proposal, nor does it suggest levels of mining activity acceptable to National Park Service.

Under alternative A (post-1985 status quo/no action), the National Park Service would review and analyze mining plans of operations submitted for proposed activity on patented and valid unpatented mining claims according to applicable regulations including 36 CFR Subpart 9A and the access provisions of 43 CFR Part 36. The National Park Service would review individual plans of operations on a case-by-case basis and prepare environmental documents as required by the National Environmental Policy Act (PL 91-190). Determinations of site-specific and cumulative mining impacts would be made qualitatively.

With the proposed action (alternative B), the National Park Service would review and analyze proposed mining plans of operations according to applicable regulations. The National Park Service would review plans of operations on a comprehensive basis and prepare environmental documents as required by the National Environmental Policy Act (PL 91-190). Target resources would be identified and used as the focal point for evaluating the effects of proposed mining activity. Determinations of site-specific and cumulative mining impacts would be made quantitatively where adequate resource information is available using resource protection goals as one evaluative tool. The goals would be established for the following target resources: arctic grayling habitat and riparian wildlife habitat. If the resource protection goal for any target resource cannot be met because of the potential effects of a proposed mining operation, that proposal could be denied unless mitigation can reduce the magnitude of the effect within the resource protection goal or otherwise protect resource values, or other circumstances would justify approval. In areas where resource protection goals have not been met because of past mining activity, operations could be denied unless the proposal did not further affect specific resources, or mitigation measures could reduce resource impacts. Resource protection goals would not be established at this time for wetlands, water quality, peregrine falcon, visual quality, cultural resources, subsistence, wilderness values, recreation, local economy, and paleontological resources.

Alternative C is similar to alternative B with two exceptions. In alternative B, the National Park Service would review and analyze proposed mining plans of operations according to applicable regulations. The National Park Service would review plans of operations on a comprehensive basis and prepare environmental documents as required by the National Environmental Policy Act (PL 91-190). Target resources would be identified and used as the focal point for evaluating the effects of proposed mining activity. Determinations of site-specific and cumulative mining impacts would be made quantitatively where adequate resource information is available using resource protection goals as one evaluative tool. The target resource goals would be established for the arctic grayling habitat and riparian wildlife habitat. If the resource protection goal for any target resource cannot be met because of the potential effects of a proposed mining operation, that proposal could be denied unless mitigation can reduce the magnitude of the effect within the resource protection goal or otherwise protect resource values, or other circumstances would justify approval. In areas where resource protection goals have not been met because of past mining activity, operations could be denied unless the proposal did not further affect specific resources, or mitigation measures could reduce resource impacts. The goals will not be established at this time for wetlands, water quality, peregrine falcon, visual quality, cultural resources, subsistence, wilderness values, recreation, local economy, and paleontological resources. Alternative C is different from alternative B since patent restrictions would be applied to all valid unpatented mining claims taken to patent in the future, which would require a change of law. Once patented, the claim surface would remain in federal ownership to limit the extent of additional conversions of patented claims to nonmining uses. The restricted patent would convey the minerals only and the claims would be subject to a stricter standard for reclamation. Also, a strengthened mining claim acquisition program would be initiated in alternative C to acquire valid unpatented and patented claims whose development by mining or otherwise would be detrimental to park values.

Under alternative D, the National Park Service would develop a mining claim acquisition plan to acquire all patented and valid unpatented mining claims in the preserve. Existing nonmining developments or improvements on patented claims would be reviewed for compatibility with park purposes and possible acquisition. Compatible nonmining developments and improvements could be excluded from acquisition. New mining plans of operations would not be accepted and new mining operations would not be allowed. Existing operations with approved plans would be allowed to complete activities, including reclamation, as approved. Plan amendments or operational modifications would not be allowed unless initiated by National Park Service or otherwise mutually agreed to. Validity determinations for all unpatented claims not examined would occur and congressional appropriations would be required for claim acquisition.

For all four alternatives, claim acquisition methods would include purchase, exchange or donation. A negotiated transaction would be sought based on fair market value. Eminent domain could be exercised in appropriate cases. Claims would be acquired under existing authorities of the secretary of the interior.

The National Park Service would pursue a program for reclamation of unreclaimed, abandoned, and acquired mined lands owned in-fee by the United States within the unit's boundaries for all alternatives.

Alternative A could have the most adverse impacts on park resources because it offers the greatest potential for additional mining and nonmining uses of mining claims. Each of the remaining alternatives provides for a varying level of reduction in adverse impacts from mining. Alternative B provides for a quantitative analysis of the cumulative effects of mining activities but does not prevent nonmining uses on claims taken to patent. In addition, alternative B does not include a strengthened program of claim acquisition. Alternative C would reduce the impacts from nonmining activities, provide for a quantitative analysis of cumulative impacts, strengthen claim acquisition, and reduce nonmining uses of claims to be taken to patent in the future. Alternative D has the greatest potential to reduce adverse surface impacts associated with mining and nonmining uses of claims.

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PURPOSE OF AND NEED FOR THE ACTION

PURPOSE OF AND NEED FOR THE ACTION

PURPOSE OF THE ACTION

The primary purpose of this Environmental Impact Statement (EIS) is to evaluate a range of alternatives for managing mining activity, analyzing cumulative impacts, and mitigating environmental impacts in Yukon-Charley Rivers National Preserve. The report was prepared in response to a U.S. district court order for an adequate environmental impact statement that evaluates the cumulative effects of mining within the preserve. This action also coincides with the need to evaluate the minerals management program in Yukon-Charley Rivers National Preserve.

ISSUES AND CONCERNS

Currently, 165 unpatented and 15 patented mining claims are recorded within the preserve (appendix 6). The management of mining and related activity must be consistent with the intent of applicable laws and regulations including the National Environmental Policy Act of 1969 (NEPA)(PL 91-190) and its implementing regulations at 40 CFR 1500-1508. Except for access, all activities associated with the exercise of valid existing mineral rights on mining claims located under the Mining Law of 1872 (30 USC 21 et seq.) are governed by NPS regulations at 36 CFR Subpart 9A which implement the provisions of the Mining in the Parks Act of 1976 (PL 94-429). In Alaska, access to mining claims is governed by the Department of the Interior Transportation and Utility System regulations at 43 CFR Part 36.

NEED FOR THE ACTION

On July 22, 1985, the United States District Court for the District of Alaska enjoined the National Park Service from approving plans of operations for mining in Alaska national park system units. The court order resulted from litigation filed by the Northern Alaska Environmental Center, Alaska Chapter of the Sierra Club, and Denali Citizens Council (Civil Case J85-009).

The court order states that some mining operations are causing environmental damage in the park units. Activities permitted by the National Park Service in approving individual mining plans of operations could result in significant cumulative environmental effects. The National Park Service was directed to comply with its mining regulations at 36 CFR Subpart 9A and prepare the required environmental documents in compliance with NEPA before approving mining operations in park units. Furthermore, the court required the National Park Service to prepare adequate environmental impact statements that consider the cumulative effects of multiple mining operations in Wrangell-St. Elias National Park and Preserve and Yukon-Charley Rivers National Preserve. This order was amended and on December 4, 1985, the district court further required the National Park Service to prepare a cumulative environmental impact statement for Denali National Park and Preserve. A final judgement and injunction were issued on March 3, 1988.

This report evaluates the cumulative effects of mining associated with a range of alternatives for managing mining activity, analyzing cumulative impacts, and mitigating environmental impacts in Yukon-Charley Rivers National Preserve. Preparation of this report does not eliminate the requirement to prepare separate environmental assessments for each proposed mining plan of operations submitted to the National Park Service. However, the evaluation of environmental impacts, including cumulative effects, in the environmental assessments will be "tiered" from the evaluation of environmental impacts in this statement as authorized by 40 CFR 1508.28.

Under similar litigation, the Bureau of Land Management (BLM) was required to prepare environmental impact statements analyzing the cumulative impacts of placer mining on the watersheds of Birch Creek, Beaver Creek, Forty Mile River, and Minto Flats by the U.S. District Court for the District of Alaska in memoranda and orders filed on May 14 and May 28, 1987. The Bureau of Land Management released the Environmental Impact Statement documents in 1988. The BLM documents have two primary objectives: (1) to identify and consider the performance standards under which placer mining may be conducted on federal land, and; (2) to comply with the court order and conduct evaluations to prepare environmental impact statements under NEPA and the section 810 subsistence requirements of the Alaska National Interest Lands Conservation Act (ANILCA) (PL 96-487).

This document differs from the BLM Environmental Impact Statement documents because it reflects the different agency mandates, management objectives, land ownership patterns, and mineral management regulations of the National Park Service and the Bureau of Land Management, and the specific requirements of the district court. The objective of the National Park Service in this statement is to assess the cumulative effects of mining, as required by the court, and to evaluate NPS mineral-management alternatives which consider exercise of valid existing mineral rights while adequately protecting park resources.

SCOPING RESULTS

Scoping activities have been conducted throughout preparation of this document. A notice of intent to prepare the Environmental Impact Statement was published in the Federal Register on May 7, 1986. Two rounds of formal scoping meetings were held. Scoping meetings to identify issues to be addressed in the report were held in Anchorage, Fairbanks, and Eagle in September 1986 and were attended by representatives of federal and state agencies, the mining community, environmental groups, and other interested individuals. Prior to conducting the meetings, more than 750 public response forms were mailed.

Scoping meetings were also held in March 1988 in Anchorage and Fairbanks to help define the range of alternatives for the Environmental Impact Statement. Prior to conducting the meetings, 1,250 public response forms were mailed. Approximately six percent of the public response forms were completed and returned.

As a result of the scoping process, target resources and study areas affected by mining activity were identified and defined for consideration in this report.

The issues raised during scoping are listed below. Issues raised, but not addressed in this statement, are listed along with the reason why they were not included.

Issues Addressed by EIS

Hydrologic changes
Fisheries habitat
Arctic grayling
Water quality
Impacts on wetlands
Aquatic ecosystem integrity
Long-term and short-term impacts
Nonmining uses of patented claims
Reclamation
Wildlife habitat
Peregrine falcon
Threatened and endangered species
Criteria for cumulative effect analysis
Impact thresholds
Magnitude of impacts
Impacts from past mining operations
Economic impacts
Access
Impacts from access

Impacts on subsistence
Heavy metals contamination
Abandoned mine lands
Impacts to scenic values
Impacts on visitor use
Administrative costs for mining claims
Acquisition costs of mining properties
Wilderness

Issues Dismissed During Scoping

Water Quality Standards. Concerns were raised over existing water quality standards. The National Park Service does not set these standards because they are the responsibility of the EPA and of each state. NPS regulations at 36 CFR 9.9(b)(7) require, at a minimum, compliance with the existing standards. It is not within the scope of this statement to assess the adequacy of existing state and federal water quality standards. Water resource protection measures and operating stipulations for approved mining plans of operations are presented in appendix 14.

Alternative Technologies. It is not a responsibility of the National Park Service to develop or require specific alternative mining technologies. That task lies more appropriately with those state and federal agencies responsible for managing mineral lands and assisting the mining industry in the economic development of mineral resources. The National Park Service is responsible for resource preservation and the protection of park values which are the focus of this report. Once the requirements for environmental protection are defined, it is up to the individual mine operator to determine how to meet those requirements.

Mineral Assessments Under Section 1010 (a) of ANILCA (PL 96-487). Several issues were raised regarding the Alaska Mineral Resource Assessment Program (AMRAP) of ANILCA (PL 96-487). This program is overseen by the U.S. Geological Survey and not the National Park Service. Specific guidelines and regulations regarding implementation of this program have not been developed. Access to NPS units for mineral assessments is allowed under the conditions defined in Section 1010 of ANILCA (PL 96-487). This program does not have an affect on the permitting actions of the National Park Service on valid existing mining claims and is, therefore, not considered in this report.

Revised Statute 2477 Rights-of-way. Many people were concerned over the issue of access and specifically Revised Statute (RS) 2477 rights-of-way. The evaluation of these right-of-way issues is not within the scope of this statement. ANILCA (PL 96-487), Title XI and its implementing regulations at 43 CFR, Part 36, affirmatively provides for adequate and feasible access to inholdings regardless of an RS 2477 settlement issue and is, therefore, not an issue for this document.

SUMMARY OF STUDY PROCESS

Preliminary issues were identified for analysis in this report based on the specific court requirements, by defining the mineral management concerns and objectives of the National Park Service, and through interpretation of applicable legislative mandates and regulatory requirements. All issues, including those identified in the formal scoping process, were synthesized into the major issues and resources to be addressed and analyzed in the Environmental Impact Statement. The project scope was defined through additional interpretation of the district court order, combined with incorporation of the major scoping issues, NPS mineral management objectives, and resource protection mandates. Consequently, a range of alternatives for managing mining activity, analyzing cumulative impacts, and mitigating environmental impacts were developed for analysis herein (see alternatives including the proposed action).

Initially, in responding to the U.S. district court, order the National Park Service intended to develop action-specific, mineral-management plan options which would define management objectives and agency actions for the major components of a mineral management program for the preserve. However, once work commenced on the Environmental Impact Statement, the National Park Service discovered that claim-specific resource base information and mineral management policy development and guidelines are not adequate to fully develop an action-specific mineral management action plan for the preserve. Consequently, the actions evaluated in this report are focused on the programmatic aspects of implementing the NPS regulations for Mining and Mining Claims (36 CFR Subpart 9A).

For the purposes of impact analysis only, a mineral development scenario was prepared and applied which relates to the statement alternatives. This scenario projects the type, extent, and location of probable mining and mining levels over a ten year period. The National Park Service developed the scenario in consultation with geologists and mineral experts from other government agencies, and representatives of the Alaska mining community.

Study areas were then identified based on future mining projections. In delineating the study areas, consideration was also given to natural geographic features such as watershed boundaries and to the influence of past mining on park resources. Existing baseline data pertaining to the major issues, alternatives, and affected resources were then gathered and supplemented with additional field data.

Cumulative effects on target resources in each study area were assessed both quantitatively and qualitatively. A predictive model that incorporated different environmental variables for each resource was developed to assist in the quantitative evaluations.

NPS MANAGEMENT AND PLANNING HISTORY

Other planning and environmental documents which address related issues in the preserve have been prepared. These documents establish management direction for the preserve and define administrative actions to implement various programs.

The Director of the National Park Service approved the General Management Plan, Land Protection Plan, and Charley Wild River Management Plan for Yukon-Charley Rivers National Preserve in January 1985. The general management plan provides overall direction for resource and park management and protection, and proposed development in the park. The land protection plan, an action document implementing specific proposals set forth in the general management plan, describes land-ownership status, land-use agreements, and presents prioritized actions needed to adequately protect park resources. The general management plan identifies where mining claims in the park are located and discusses activities associated with the claims. The land protection plan identifies claims which present potential threats to park resources and which should be acquired. The river management plan provides direction for carrying out the intent of Congress in adding the Charley River, an outstanding example of pristine conditions on an Alaskan river system, to the national wild and scenic rivers system.

The Final Environmental Impact Statement for Wilderness Recommendation for Yukon-Charley Rivers National Preserve was released in August 1988. This document was prepared in compliance with section 1317 of ANILCA (PL 96-487). It evaluates the lands, in Yukon-Charley Rivers National Preserve, for wilderness designation suitability and recommends for wilderness designations to Congress. The impacts of the various wilderness designation alternatives on existing mining properties are discussed herein.

The Environmental Overview and Analysis of Mining Effects for Yukon-Charley Rivers National Preserve was published in July 1982 to assist the National Park Service and other interested agencies and individuals to adequately assess the effects of existing and future mining activities and to expedite the processing of proposed mining plans of operations. Environmental baseline data are presented in the document and intended to facilitate preparing the necessary environmental compliance documents for individual mining plans of operations.

CONSIDERATIONS AND CONSTRAINTS

Legislative Framework

On December 1, 1978, the President of the United States, acting under the authority granted in the Antiquities Act of 1906 (PL 59-209), proclaimed 2,523,509 acres of land in central Alaska adjacent to the international boundary as Yukon-Charley National Monument. Proclamation 4626 called for preserving areas with significant historic, scientific, and ecological features including the remains of early mining activity; geological and paleontological features; the Charley River basin, one of Alaska's major clear-flowing rivers; relict Pleistocene plant communities; breeding habitat for the endangered peregrine falcon; and wildlife populations and habitat including Dall sheep, moose, bear, and wolf. The monument was established subject to valid existing rights, including mining claims located under the Mining Law of 1872 (30 USC 21 et seq.). The proclamation withdrew the monument from further mineral entry.

The Mining in the Parks Act of 1976 (PL 94-429) closed six national park system units to mineral entry upon a congressional finding that application of the United States mining laws, if not discontinued, would conflict with the purposes for which individual park units were established. The Congress also directed that all mining operations in national park system units should be conducted to prevent or minimize damage to the environment and other park resources. Therefore, the Mining in the Parks Act of 1976 (PL 94-429) also authorized the secretary of the interior to regulate mining activity on existing patented and valid unpatented mining claims located within park units. These regulations, at 36 CFR Subpart 9A, apply to mining and related activity associated with patented and valid unpatented mining claims. The primary enforcement tools consist of a mining plan of operations and performance bonding.

On December 2, 1980, section 201(10) of the Alaska National Interest Lands Conservation Act (PL 96-487) redesignated the monument as Yukon-Charley Rivers National Preserve. Preserves are managed in the same fashion as parks except that hunting and trapping are allowed in preserves but not in parks. The federal lands within Yukon-Charley Rivers National Preserve were withdrawn from location, entry, and patent under the United States mining laws, subject to valid existing rights, by section 206 of ANILCA (PL 96-487).

Relationship to Other Environmental Programs

Neither the proposed action nor any of the alternatives would affect prime or unique farm lands. Components of the National Wild and Scenic Rivers or National Trails systems would not be affected. None of the lands involved would affect lands within the coastal boundaries of the state of Alaska and the activities on the lands involved would not affect lands within the coastal boundaries; therefore, a review for consistency with the Alaska Coastal Management Program is not required.

Regulatory Requirements

An operator proposing to conduct mining operations, as defined under 36 CFR 9.2(b), are first required to obtain approval of the plan of operations from the National Park Service. All functions, work, and activities on patented and valid unpatented mining claims located under the General Mining Law of 1872 (30 USC 21 et seq.) in units of the national park system in Alaska, including those of a commercial and non-commercial "recreational" nature such as suction dredging, require an approved mining plan of operations. Individual plans of operations would be processed in the order that complete plans are received.

Principal NPS actions relative to mining operations include

- verification of a proposed operators right to operate
- preliminary or tentative evaluations of validity for unpatented mining claims and, where appropriate, National Park Service can undertake a full validity determination
- review and analysis of proposed mining operations

- bonding to assure operator performance according to the approved plan and stipulations
- monitoring of operations for compliance with the terms of the approved plan and stipulations
- enforcement of the approved plan and stipulations through administrative or civil actions as necessary

Under 36 CFR Subpart 9A, operations on claims in NPS units are reviewed under decision standards for plan of operations approval (36 CFR 9.10) and requirements for reclamation (36 CFR 9.11). The specific regulatory requirements for plan of operation's approval and reclamation depend on whether a mining claim is unpatented or patented and, if patented, whether the claim was patented with or without surface use restrictions (National Park Service Minerals Management Regulations for Mining and Mining Claims 36 CFR 9A) (appendix 15).

The decision by the National Park Service to approve or deny a proposed plan of operations is a federal action which requires compliance with all federal statutes and executive orders requiring federal agencies to review and assess their actions for impact on the environment. These statues include, but are not limited to, the National Environmental Policy Act of 1969 (PL 91-190), the Endangered Species Act (PL 93-205), and the National Historic Preservation Act (PL 89-665), the Clean Air Act (PL 91-604), and the Clean Water Act (PL92-500). Before operations can be approved, operators must obtain permits required by these statutes. Concerning water-related regulatory requirements, operators are required to comply with the U.S Army Corps of Engineers program and other related regulatory requirements administered by EPA and other agencies (appendix 16).

Typically, the National Park Service would complete an environmental assessment of the proposed mining plan of operations, which evaluates alternatives to the proposed plan of operations including the no-action plan. In the environmental assessment, the National Park Service would make a determination of the effects of the proposed operation, including the proposed reclamation. If the plan of operations would meet the applicable standard of 36 CFR 9.10, the plan can be approved.

In Alaska park units only, access to mining claims is governed by the Department of the Interior transportation and utility system regulations for Alaska (43 CFR Part 36). These regulations implement section 1110 (b) of ANILCA (PL 96-487) which guarantees adequate and feasible access to valid inholdings for economic and other purposes. Section 36.10 of the access regulations specify procedures for access across park lands to valid inholdings, including patented and valid unpatented mining claims.

The National Park Service will specify alternate adequate and feasible routes or methods if the requested routes or methods

- would cause significant impacts on park resources
- would jeopardize public health and safety
- is not consistent with the unit's management plan or purpose for addition to the national park system
- are not necessary to accomplish the individual's land use objective

The protection of water resources and related values including water quality, wetlands, floodplains, and fish habitat will be achieved according to the procedures outlined in the Water Resource Protection Measures and Operating Stipulations (appendix 14). The protection of cultural resources will be achieved according to procedures outlined explicitly in a programmatic agreement (appendix 7) developed by the National Park Service, Alaska State Historic Preservation Officer, and Advisory Council on Historic Preservation.

ALTERNATIVES INCLUDING THE PROPOSED ACTION

ALTERNATIVES INCLUDING THE PROPOSED ACTION

INTRODUCTION

Four alternatives, including a proposed action, for managing mining activity and mitigating environmental impacts in the preserve are discussed herein. Other alternatives considered, but eliminated from detailed study, are discussed at the end of this section.

Three of the alternatives evaluated in this document (alternatives A, B, and C) involve review and analysis of proposed mining plans of operations according to the existing regulatory structure. Alternative A (Post-1985 Status Quo/No Action) would follow the mining plan of operations review and analysis process established by current regulation. Evaluations of mining impacts for individual operations would be made on a case-by-case basis, including a qualitative evaluation of cumulative effects. Alternative B (Proposed Action) follows the review and analysis process of mining plan of operations under current regulations but varies from alternative A because it emphasizes a quantitative evaluation of cumulative effects. Alternative C is identical to alternative B with two exceptions. Alternative C also includes patent restrictions for unpatented mining claims patented in the future and a strengthened program of patented and unpatented mining claim acquisition. Alternative D proposes the acquisition of all mining claims in the preserve.

Probable Mineral Development Scenario

For the purposes of analysis, a mineral development scenario was prepared and applied in the four alternatives. The scenario provides the basis for predicting where and to what extent future mining activity might reasonably occur in the preserve over the next ten years. A maximum of four operations are projected for development. Environmental impacts from potential future mining were analyzed to meet the requirements of the National Environmental Policy Act of 1969 (NEPA)(PL 91-190). The scenario does not represent an NPS proposal, nor does it suggest levels of mining activity which are acceptable to the National Park Service. Of the four alternatives, alternative A represents the maximum mineral development or worst-case scenario for mining activity. This would occur if all four operations were active at one time over the next ten years.

Recorded Placer and Lode Mining Claims

Currently, 180 unpatented and patented placer mining claims are recorded in the preserve (appendix 6). For the purposes of this statement, all currently recorded unpatented mining claims located in the preserve are assumed valid. Implied assumptions regarding the validity of any unpatented claim are not intended by the mineral development scenario nor the analysis and conclusions of this report.

ALTERNATIVE A (POST-1985 STATUS QUO/NO ACTION) - Review and Analyze Mining Proposals Under Regulations at 36 CFR Subpart 9A Using Qualitative Evaluations of Cumulative Effects

Under alternative A, operations on existing patented and valid unpatented mining claims in the preserve would continue to be subject to the requirements of National Park Service Minerals Management regulations at 36 CFR Subpart 9A - Mining and Mining Claims, the access provisions of the Department of the Interior's Transportation and Utility System regulations at 43 CFR Part 36, and other applicable state and federal legislative and regulatory requirements.

The National Park Service would review all proposed, mining plans of operations on a case-by-case basis and prepare environmental documents as required by the National Environmental Policy Act of 1969 (PL 91-190). Determinations of site-specific and cumulative effects of individual operations would be made qualitatively using claim specific field information and professional judgments of the degree of site specific and cumulative impacts. If the National Park Service determines that the effects of proposed mining operations would violate the decision standards for plan of operation's approval (36 CFR 9.10) and the effects could not be sufficiently mitigated, the plan of operations would be denied. Plans of operations would not be approved if park resources would incur unacceptable damage.

In cases where it is not possible to approve a mining plan of operations because park resources would receive unacceptable damage, the National Park Service would pursue acquisition of the claims by purchase, exchange or donation. A negotiated transaction based on fair market value would be sought. In appropriate situations where a negotiated acquisition cannot be attained, then use of eminent domain may be considered. Valid claims would be acquired under existing authorities of the secretary of the interior.

The National Park Service would pursue a reclamation program on unreclaimed, abandoned, and acquired mined lands owned in-fee by the United States and located within the preserve boundary.

The protection of water resources and related values including water quality, wetlands, floodplains, and fish habitat will be achieved according to the procedures outlined in the Water Resource Protection Measures and Operating Stipulations for Approved Mining Plans of Operations (appendix 14). These procedures include the following regulations, permits, and enforcement actions: National Effluent Limitation Guidelines as promulgated by EPA on May 24, 1988; National Pollution Discharge Elimination System (NPDES) permits; best management practices as stipulated in plan of operations review according to 36 CFR Subpart 9A; Army Corps of Engineers section 404 dredge and fill permits; executive orders for protection of wetlands and floodplain management; Alaska Department of Fish and Game anadromous fish and habitat protection permits; spill prevention, control and counter measures plan (SPCC); Reclamation according to 36 CFR 9.11; and enforcement program in cooperation with the Environmental Protection Agency and the Alaska Department of Environmental Conservation.

The protection and preservation of cultural resources will be accomplished under the provisions of the Cultural Resources Programmatic Agreement (appendix 7) between the National Park Service, the Alaska State Historic Preservation Officer and the Advisory Council on Historic Preservation.

ALTERNATIVE B (PROPOSED ACTION) - Review and Analyze Mining Proposals Under Regulations at 36 CFR Subpart 9A Including Quantitative Evaluations of Cumulative Effects and Resource Protection Goals

Under alternative B, operations on existing patented and valid unpatented mining claims in the preserve would continue to be subject to the requirements of the National Park Service Minerals Management regulations at 36 CFR Subpart 9A - Mining and Mining Claims, the access provisions of the Department of Interior's Transportation and Utility System regulations at 43 CFR Part 36 and other applicable state and federal legislative and regulatory requirements.

The National Park Service would review all proposed mining plans of operations on a comprehensive basis and prepare environmental documents as required by the National Environmental Policy Act of 1969 (PL 91-190). In alternative B, the evaluation of mining proposals would include a quantitative evaluation of cumulative effects (where adequate information is available as opposed to the qualitative evaluation in alternative A. "Target" resources identified in this report would be used as one of the factors for determining the effects of a proposed mining operation. Where adequate resource information is available on target resources, resource protection goals would be established and used to evaluate the relative level of cumulative impacts on target resource(s) and be considered regarding decisions of approval or denial for proposed mining plans of operations. Resource protection goals would not be established for target resources where adequate information was not available. However, target resources and resource protection goals are not the only elements used in the decision process. Impacts of proposed mining operations on all resources, of concern to the National Park Service, will be considered in the decision to approve or deny a mining plan of operations under 36 CFR 9.10.

New information obtained by the National Park Service could modify the levels set for the current goals or lead to the establishment of goals for other target resources which currently have no resource protection goal. Establishing goal levels allows for quantitative evaluations of the cumulative effects of mining and comparisons to the regulatory standards for plan of operations approval (36 CFR 9.10). However, goals are not absolute thresholds which, if not met, will automatically or necessarily cause a plan of operations to be denied. Goals are only part of the information to be used by the National Park Service in evaluating cumulative effects and determining the appropriate action for on a proposed mining plan of operations. See appendix 2 for a detailed description of the quantitative method to evaluate cumulative effects of mining plans of operations.

Resource protection goals are goals established for preventing or minimizing damage to target resources from the cumulative effects of mining. The goal is a percentage of the premining condition that the National Park Service will attempt to reestablish or maintain to protect the resource. The goal percentages reflect resource requirements and NPS mandates and authorities in Alaska (appendixes 1 and 5). A decrease in the condition of a target resource as a result of mining activity to a level below the resource protection goals would be considered according to the regulatory requirements of 36 CFR 9.10. The resource protection goals are listed below.

Target Resource	Protection Level	
	Long Term	Short Term
Arctic Grayling Habitat	90%	90%
Riparian Wildlife Habitat	99%	90%

These values apply only to the study areas analyzed in this document. The target resources which are also analyzed in this report but for which no resource protection goals exist are

wetlands
water quality
peregrine falcons
visual quality
cultural resources
subsistence use of resources
recreation and visitor use
wilderness values
local economy
paleontological resources

Proposed mining plans would be processed according to NPS regulatory requirements (36 CFR Subpart 9A) and other applicable regulatory requirements including U.S. Army Corps of Engineers or Environmental Protection Agency permits. When an operation is approved, the effects of that operation would be added to the existing conditions of the target resources at that time. The total effects would become the new existing condition base for target resources under which the next complete proposed plan or operations would then be evaluated. When a second plan is approved, its effects would be added to the most current existing conditions and thus create a new base against which the third proposal would be evaluated, and so forth. In this manner, the cumulative impacts of mining and the information on the environmental quality of an area could be maintained.

If the resource protection goal for any target resource cannot be met because of the potential effects of a proposed mining operation, that proposal could potentially be denied unless (1) mitigation can be employed to reduce the magnitude of the effect within the resource protection goal, or (2) resource values would be protected, or (3) if there were extenuating circumstances that would justify approval. In areas where resource protection goals have not been met as a result of past mining activity, operations could potentially be denied unless the proposal did not further affect specific resources, or mitigating measures could be implemented to reduce resource impacts for the study areas. Examples of mitigation measures could include "offsets" which would allow an operator to proceed only if sufficient reclamation of previously mined areas could be achieved prior to mining the area proposed in a plan of operations. Other mitigation measures could include actions which compensate for impacts within an operator's claim or on other areas exhibiting mining related resource damage, or reclamation of claim areas patented without restrictions to the standards prescribed in 36 CFR 9.11(a)(2) and 9.11(b).

In cases where it is not possible to approve a mining plan of operations because park resources would receive unacceptable damage, the National Park Service would pursue acquisition of the claims by purchase, exchange, or donation. A negotiated transaction based on fair market value would be sought. In appropriate situations where a negotiated acquisition cannot be attained, then use of eminent domain may be considered. Valid claims would be acquired under existing authorities of the secretary of the interior.

The National Park Service would pursue a reclamation program on unreclaimed, abandoned, and acquired mined lands, owned in-fee by the United States, located and within the preserve boundary.

The protection of water resources and related values including water quality, wetlands, floodplains, and fish habitat will be achieved according to the procedures outlined in the Water Resource Protection Measures and Operating Stipulations for Approved Mining Plans of Operations (appendix 14). These procedures include the following regulations, permits, and enforcement actions: EPA Effluent Limitation Guidelines for Placer Mining as promulgated on May 24, 1988; National Pollution Discharge Elimination System (NPDES) permits; best management practices as stipulated in plan of operation review according to 36 CFR Subpart 9A; Army Corps of Engineers section 404 dredge and fill permits; executive orders for protection of wetlands and floodplain management; Alaska Department of Fish and Game anadromous fish and habitat protection permits; Alaska Department of Environmental Conservation Wastewater disposal regulations; spill prevention, control and counter measures plan (SPCC); reclamation according to 36 CFR 9.11; and enforcement in cooperation with the Environmental Protection Agency and the Alaska Department of Environmental Conservation.

The protection and preservation of cultural resources will be accomplished under the provisions of the Cultural Resources Programmatic Agreement (appendix 7) between the National Park Service, the Alaska State Historic Preservation Officer and the Advisory Council on Historic Preservation.

ALTERNATIVE C - Review and Analyze Mining Proposals Under Regulations at 36 CFR Subpart 9A Using a Quantitative Evaluation of Cumulative Effects and Resource Protection Goals with Restrictions for Future Patents and a Strengthened Mining Claim Acquisition Program

Alternative C is similar to alternative B with the following exceptions. For valid unpatented claims within the preserve to be taken to patent in the future, the patent would convey the minerals only and the claims, if mined, would be subject to a stricter standard for reclamation. Also, a strengthened mining claim acquisition program would be initiated to acquire valid unpatented and patented claims whose development by mining or otherwise would be detrimental to park values.

The United States holds title to all of the interests in the lands containing unpatented claims except the locatable minerals for which the claim was located and the right to use the surface of the claim for mining purposes. The NPS regulations governing mining activities on unpatented claims provide greater resource protection generally than for patented claims under the strict decision standards for plan of operations approval at 36 CFR 9.10(a)(2) and 9.10(a)(3), and reclamation standards at 36 CFR 9.11(a)(2) and 9.11(b). Currently when a claim is patented in NPS units, the title to the surface and subsurface estates is conveyed in-fee to the claimant. The NPS regulatory control over activities on a patented claim is less under the decision standard for plan of operations approval at 36 CFR 9.10(a)(1) and reclamation standard of 9.11(a)(1). Also once patented, the claim surface may be used or developed for purposes other than mining which in some cases can have a greater and longer term impact on park resources.

Patents issued for mining claims in the future would be limited to the locatable minerals only. The claimant would continue to have the right to use the surface within the claim boundary for mining purposes. At present, there is no statutory authority to restrict mining claim patents in parks. Therefore, implementing this element of the alternative will require a change of law.

The National Park Service would review all proposed mining plans of operations on a comprehensive basis and prepare environmental documents as required by the National Environmental Policy Act of 1969 (PL 91-190). As in alternative B, the evaluation of mining proposals would include, where adequate information is available, a quantitative evaluation of cumulative effects. "Target" resources identified in this statement would be used as one of the factors for determining and evaluating the effects of proposed mining operation. Where adequate resource information is available on target resources, resource protection goals would be established and used to evaluate the relative level of cumulative impacts on target resource(s) and be considered in decisions regarding approval or denial of proposed mining plans of operations. Resource protection goals would not be established for target resources where adequate information was not available. However, target resources and resource protection goals are not the only elements used in the decision process. Impacts of proposed mining operations on all resources of concern to the National Park Service will be considered in the decision to approve or deny a mining plan of operations under 36 CFR 9.10.

New information obtained by the National Park Service could modify the protection goals levels set for the current resource protection goals or lead to the establishment of these goals for other target resources which currently have no resource protection goal. Establishing goal levels allows for quantitative evaluation of the cumulative effects of mining and comparison of that evaluation against the regulatory standards for plan of operations approval (36 CFR 9.10). However, these goals are not absolute thresholds which, if not met, will automatically or necessarily cause a plan of operations to be denied. Resource protection goals are only part of the information to be used by the National Park Service in evaluating cumulative effects and determining the appropriate action for a proposed mining plan of operations. See appendix 2 for a detailed description of the quantitative method to evaluate cumulative effects of mining plans of operations.

Resource protection goals are goals established for preventing or minimizing damage to target resources from the cumulative effects of mining. The goal is a percentage of the premining condition that the National Park Service will attempt to reestablish or maintain to protect the resource. The goal percentages reflect resource requirements and NPS mandates and authorities in Alaska (appendixes 1 and 5). A decrease in the condition of a target resource as a result of mining activity to a level below the resource protection goal would be considered according to the regulatory requirements of 36 CFR 9.10. The resource protection goals are listed below.

Target Resource	**Protection Level**	
	Long Term	Short Term
Arctic Grayling Habitat	90%	90%
Riparian Wildlife Habitat	99%	90%

These values apply only to the study areas analyzed in this document. The target resources which are also analyzed in this report, but for which no goals exist, are

wetlands
water quality
peregrine falcon
visual quality
cultural resources
subsistence use of resources
recreation and visitor use
wilderness values
local economy
paleontological resources

Proposed mining plans would be processed according to NPS regulatory requirements (36 CFR Subpart 9A) and other applicable regulatory requirements including U.S. Army Corps of Engineers or Environmental Protection Agency permits. When an operation is approved, the effects of that operation would be added to the existing conditions of the target resources at that time. The total effects would become the new existing condition base for target resources under which the next complete proposed plan or operations would then be evaluated. When a second plan is approved, its effects are added to the most current existing conditions and thus create a new base against which the third proposal would be evaluated, and so forth. In this manner, the cumulative impacts of mining and the information on the environmental quality of an area could be maintained.

If the resource protection goal for any target resource cannot be met because of the potential effects of a proposed mining operation, that proposal could potentially be denied unless (1) mitigation can be employed to reduce the magnitude of the effect within the resource protection goal, or (2) resource values would be protected, or (3) if there were extenuating circumstances that would justify approval. In areas where resource protection goals have not been met as a result of past mining activity, operations could potentially be denied unless the proposal did not further affect specific resources, or mitigating measures could be implemented to reduce resource impacts for the study areas. Examples of mitigation measures could include "offsets" which would allow an operator to proceed only if sufficient reclamation of previously mined areas could be achieved prior to mining the area proposed in a plan of operations. Other mitigation measures could include actions which compensate for impacts within an operator's claim or on other areas exhibiting mining related resource damage, or reclamation of claim areas patented without restrictions to the standards prescribed in 36 CFR 9.11(a)(2) and 9.11(b).

In cases where it is not possible to approve a mining plan of operations because park resources would receive unacceptable damage, the National Park Service would pursue acquisition of the claims by purchase, exchange or donation. A negotiated transaction based on fair market value would be sought. In appropriate situations where a negotiated acquisition cannot be attained, then use of eminent domain may be considered. Valid claims would be acquired under existing authorities of the secretary of the interior.

Also under alternative C a strengthened mining claim acquisition program for the entire preserve would be implemented by the National Park Service. Valid unpatented and patented mining claims with sensitive resources or values would be identified and ranked for acquisition. This action would be directed toward mining claims where mining activities or development of the surface for purposes other than mining would be detrimental to park purposes and values and would not be in accord with park management direction. Identification and ranking of specific claims for acquisition would be accomplished using criteria that identify values or resources to be preserved and incompatible uses and developments (appendix 9). Funds would be actively sought through Congressional appropriations to accomplish acquisition of claims. Methods of acquisition will be the same as described in the preceding paragraph.

Necessary revisions to the existing land protection plan for the preserve would be made according to existing U. S. Department of the Interior policy and implementing procedures on use of the federal portion of the Land and Water Conservation Fund (47 FR 19784). Following approval of the revised land protection plan, funding would be requested through the Congressional appropriations process to implement the strengthened mining claim acquisition program.

The National Park Service would pursue a reclamation program on unreclaimed, abandoned, and acquired mined lands, owned in-fee by the United States, and located within the preserve boundary.

The protection of water resources and related values including water quality, wetlands, floodplains, and fish habitat will be achieved according to the procedures outlined in the Water Resource Protection Measures and Operating Stipulations for Approved Mining Plans of Operations (appendix 14). These procedures include the following regulations, permits, and enforcement actions: EPA Effluent Limitation Guidelines for Placer Mining as promulgated on May 24, 1988; National Pollution Discharge Elimination System (NPDES) permits; best management practices as stipulated in plan of operation review according to 36 CFR Subpart 9A; Army Corps of Engineers section 404 dredge and fill permits; executive orders for protection of wetlands and floodplain management; Alaska Department of Fish and Game anadromous fish and habitat protection permits; Alaska Department of Environmental Conservation Wastewater disposal regulations; spill prevention, control and counter measures plan (SPCC); reclamation according to 36 CFR 9.11; and enforcement in cooperation with the Environmental Protection Agency and the Alaska Department of Environmental Conservation.

The protection and preservation of cultural resources will be accomplished under the provisions of the Cultural Resources Programmatic Agreement (appendix 7) between the National Park Service, the Alaska State Historic Preservation Officer and the Advisory Council on Historic Preservation.

With this alternative, mining plan of operations review and evaluation and NPS reclamation of previously disturbed areas abandoned or otherwise acquired by the United States would proceed as specified in alternative B regardless of whether the future patent restrictions and strengthened claim acquisition elements of the alternative are operative or not. This results in the National Park Service in effect implementing alternative B if Congress does not enact special legislation restricting future patents for mining claims or appropriate funding to implement the strengthened claim acquisition plan.

ALTERNATIVE D - Acquire All Mining Claims

Under this alternative, a mining claim acquisition plan would be developed and implemented to acquire the surface and subsurface estates of all patented mining claims and the rights held in valid unpatented mining claims in the preserve. Existing nonmining developments or improvements on patented claims would be reviewed for compatibility with park purposes and possible acquisition. Compatible nonmining uses and developments could be excluded from acquisition.

While acquisition is proceeding, no new mining plans of operations would be accepted by the National Park Service and no new mining operations would be allowed. Existing approved mining operations would be allowed to complete activities including reclamation as detailed in the approved plan of operations, but plan amendments or operational modifications would not be allowed unless initiated by National Park Service or otherwise mutually agreed upon.

The National Park Service would pursue a reclamation program on unreclaimed, abandoned, and acquired mined lands, owned in-fee by the United States and located within the preserve boundary.

The existing land protection plan would be revised according to the existing U.S. Department of the Interior's policy and implementation procedures on use of the federal portion of the land and water conservation fund. All mining claims in the preserve would be ranked for acquisition.

The National Park Service would pursue acquisition of the claims by purchase, exchange or donation. A negotiated transaction based on fair market value would be sought. In appropriate situations where a negotiated acquisition cannot be attained, then use of eminent domain may be considered. Valid claims would be acquired under existing authorities of the secretary of the interior.

ALTERNATIVES CONSIDERED BUT ELIMINATED FROM FURTHER ANALYSIS

During the scoping and development process of this document, additional alternatives were identified for inclusion. The National Park Service considered those suggestions but eliminated them from further study, either because they were not considered feasible, or because they were outside the scope of this report.

A Pre-July 22, 1985 Status Quo Alternative

Under this alternative, the approval of mining plans of operations would be undertaken according to the pre-injunction procedures utilized prior to 1985. This would result in less than full application of the NPS mining regulations (36 CFR Subpart 9A) and would not involve a complete analysis of cumulative effects. This alternative was rejected because it represents a continuation of activities susceptible to further or continuing injunctions, thereby precluding any approval of mining under the NPS mining regulations.

A No-Action Alternative Where National Park Service Would Not Accept Mining Plans of Operations

Under this alternative, the National Park Service would not take any action to process and approve or disapprove mining plans of operations submitted to the bureau. This absence of bureau action constitutes a violation of the NPS mining regulations. Specifically, by not taking any action on submitted plans of operations, the National Park Service would be in violation of section 9.10(b) and would also probably prejudice an operator's right to appeal an agency decision under section 9.14. This would leave claimants with no option other than to seek compensation through court action or to otherwise force the National Park Service to take action. Due to the unreasonableness of this alternative, it is not analyzed herein.

A no-action alternative (alternative A) was developed which fully implements the NPS mining regulations and provides for an assessment of cumulative effects. The National Park Service considers alternative A to be within the realm of reasonable alternatives and the alternative that most nearly fulfills the requirement for a no-action alternative.

Revise NPS Minerals Management Regulations

An alternative to revise the NPS minerals-management regulations for mining and mining claims (36 CFR Subpart 9A) was suggested and considered. In recent years, the National Park Service has been requested to revise these regulations to either strengthen or relax their resource protection provisions and plan of operations approval standards. However, the current regulations reasonably allow for the exercise of valid existing mineral rights while providing an adequate level of resource protection as mandated by the Mining in the Parks Act of 1976 (PL 94-429). Prior to promulgation, these regulations were considerably reviewed and commented upon by the public. The National Park Service believes that the current regulations properly fulfill the mandate of the mining in the parks act. Thus, an alternative to revise the regulations was considered to be outside of the scope of this document.

Remove Mining Areas From the Preserve Through Land Exchanges or Boundary Modifications

ANILCA (PL 96-487) authorized the secretary of the interior to exchange lands or interests within NPS units with the state of Alaska, federal agencies, municipalities, private corporations, and individuals. The removal of any mining claims from within the unit by exchange or boundary modification has been dismissed as inappropriate and beyond the scope of this report. This finding is based on the location of mining claims and their considerable distance from park boundaries, the loss of park resources and values that would result from exchanges or boundary modifications, and the creation of non-NPS land units within the preserve that could be managed in a manner incompatible with park management.

COMPARISON OF ALTERNATIVES

The following table presents a comparison of the major elements of the alternatives evaluated.

Table 1. Comparison of Alternatives

	Alternative A	Alternative B	Alternative C	Alternative D
Resource Protection Goals Considered	no	yes	yes	no
Enhanced Consideration of Cumulative Effects	no	yes	yes	no
Patent Restrictions	no	no	yes	no
Emphasis on Claim Acquisition	low	low	moderate	high
Mining Activity Level	high	moderate	moderate	low to none
Intensified Reclamation and Mitigation	no	yes	yes	yes
Development Potential for Nonmining Uses of Patented Claims	high	high	moderate	low

SUMMARY OF IMPACTS

Table 2. Comparison of Environmental Consequences Among Alternatives for the Woodchopper/Coal/Sam Creek Study Area

ALTERNATIVE A No Action	ALTERNATIVE B Proposed Action	ALTERNATIVE C	ALTERNATIVE D
WETLANDS			
Long-term - major loss of premining wetlands from past mining; new loss of 70 acres; reduced ecological value to aquatic and wildlife resources; any nonmining developments on patented claims could have major impacts. **Short-term** - same as long-term.	**Long-term** - major loss of premining wetlands from past mining; new loss of less than 70 acres; reduced ecological value to aquatic and wildlife resources; any nonmining developments on patented claims could have major impacts. **Short-term** - same as long-term.	**Long-term** - major loss of premining wetlands from past mining; new loss would be less than under alternative B; reduced ecological value to aquatic and wildlife resources less than alternative B; any for nonmining developments less than under alternative B. **Short-term** - same as long-term.	**Long-term** - major loss of premining wetlands from past mining; no new loss of wetlands would occur. **Short-term** - none.
AQUATIC RESOURCES			
Water Quality			
Long-term - altered water regimes, elevated metal concentrations, accelerated erosion and sediment transport, increased turbidity; any nonmining developments on patented claims could have additional impacts. **Short-term** - potential for reduced flows and spillage of fuels and hazardous chemicals; no major impacts.	**Long-term** - potential impacts same as under alternative A, but of a lesser intensity. **Short-term** - same as alternative A.	**Long-term** - potential for altered water regimes, elevated metal concentrations, accelerated erosion and sediment transport, increased turbidity, and nonmining developments on patented claims would be less than under alternative B. **Short-term** - potential for reduced flows and spillage of fuels and hazardous chemicals less than under alternative B.	**Long-term** - altered water regimes, accelerated erosion and sediment transport, increased turbidity from past mining; no measurable evidence of hazardous material contamination or adverse effects on aquatic resources; no new impacts would occur. **Short-term** - some increases in sediment and turbidity may occur during reclamation.
Arctic Grayling Habitat			
Long-term - major loss of 22.5% of premining habitat from past mining; new loss of 1.5%; major impact from cumulative loss of 24%; any nonmining developments on patented claims could have major impacts **Short-term** - new loss of 4.8% of premining habitat; major impact from cumulative loss of 27.3%.	**Long-term** - major loss of 22.5% of premining habitat from past mining; new loss less than 1.5%; cumulative loss less than 24%; any nonmining developments could have major impacts. **Short-term** - new loss of less than 4.8% of premining habitat, cumulative loss of less than 27.3%.	**Long-term** - major loss of 22.5% of premining habitat from past mining; new loss would be less than alternative B; potential for nonmining impacts less than alternative B. **Short-term** - new habitat loss would be less than under alternative B; potential for nonmining disturbance lower than for alternative B.	**Long-term** - major loss of 22.5% of premining habitat from past mining; no new impacts would occur. **Short-term** - some minor disturbance may occur during reclamation of acquired disturbed areas.

Table 2. Continued: Comparison of Environmental Consequences Among Alternatives for the Woodchopper/Coal/Sam Creek Study Area

ALTERNATIVE A No Action	ALTERNATIVE B Proposed Action	ALTERNATIVE C	ALTERNATIVE D
RIPARIAN WILDLIFE HABITAT			
Long-term - major loss of 18.8% of premining habitat during past mining; new loss of 70 acres; major impact from cumulative loss of 20.4%; any nonmining developments on patented claims could have major impacts. **Short-term** - 51 acres of new disturbance, major cumulative impact of 21.5% habitat loss; nonmining disturbance would add to impacts.	**Long-term** - major loss of 18.8% premining habitat during past mining; new loss of less than 70 acres, cumulative loss of less than 20.4% of premining habitat; any nonmining developments could have major impacts. **Short-term** - new disturbance of less than 51 acres, cumulative loss of less than 21.5% of premining habitat; nonmining disturbance would add to impacts.	**Long-term** - major loss of 18.8% premining habitat: new loss would be less than under alternative B; potential for nonmining impacts would be lower than for alternative B. **Short-term** - new habitat loss would be less than under alternative B; potential for nonmining disturbance lower than for alternative B.	**Long-term** - major loss of 18.8% of premining habitat during past mining; no new loss of habitat or nonmining impacts would occur. **Short-term** - some minor disturbance impacts would occur during reclamation of acquired mined sites.
PEREGRINE FALCON PREY HABITAT			
Long-term - 841 acres lost during past mining; 70 acres of new disturbance, cumulative loss of 911 acres, mostly low quality habitat; no major impacts; any nonmining developments could have major impacts. **Short-term** - 51 acres new disturbance, 962 acres cumulative disturbance, mostly low quality habitat; no major impact.	**Long-term** - 841 acres lost during past mining; new disturbance of less than 70 acres, cumulative loss of less than 911 acres; no major impact; any nonmining developments could have major impacts. **Short-term** - new disturbance of less than 51 acres, cumulative disturbance of less than 962 acres; no major impact.	**Long-term** - 841 acres lost during past mining; new disturbance would be less than under alternative B; potential for nonmining disturbance less than for alternative B; no major impact. **Short-term** - new disturbance less than under alternative B; no major impact.	**Long-term** - 841 acres lost during past mining; no new loss of habitat or nonmining impacts would occur; no major impact. **Short-term** - some minor disturbance impacts would occur during reclamation of acquired mined sites.
VISUAL QUALITY			
Long-term - 0.76% of premining landscape disturbed during past mining; 70 acres of new disturbance, cumulative disturbance of 0.81%; any nonmining developments of patented claims could have major impacts.	**Long-term** - 0.76% of premining landscape disturbed during past mining; new disturbance of less than 70 acres; cumulative disturbance of less than 0.81% of the premining, pristine landscape; any nonmining developments could have major impacts.	**Long-term** - 0.76% of premining landscape disturbed during past mining; new disturbance less than under alternative B; potential for nonmining impacts lower than under alternative B.	**Long-term** - 0.76% of pristine landscape disturbed during past mining; no new disturbance or nonmining impacts would occur.
CULTURAL RESOURCES			
Impacts would be avoided or mitigated through programmatic agreement with Alaska State Historic Preservation Officer and ACHP.	- same as alternative A.	- same as alternative A.	- same as alternative A.

Table 2. Continued: Comparison of Environmental Consequences Among Alternatives for the Woodchopper/Coal/Sam Creek Study Area

ALTERNATIVE A No Action	ALTERNATIVE B Proposed Action	ALTERNATIVE C	ALTERNATIVE D
SUBSISTENCE			
Long-term - some reductions in grayling, moose, and furbearer habitats; claims areas used very little for subsistence; no major impacts. **Short-term** - same as long-term.	**Long-term** - reductions in grayling, moose, and furbearer habitats would be less than under alternative A; no major impacts. **Short-term** - same as long-term.	**Long-term** - reductions in grayling, moose, and furbearer habitats would be less than under alternative B; no major impacts. **Short-term** - same as long-term.	**Long-term** - some reduction in grayling, moose, and furbearer habitats during past mining; no new impacts would occur.
RECREATION AND VISITOR USE			
Long-term - new and past disturbance would affect many recreational attributes, but use of the area is very small; active mine viewing would be enhanced; nonmining development could have major impacts. **Short-term** - same as long-term.	**Long-term** - same as alternative A except that fewer opportunities for active mine viewing would exist. **Short-term** - new mining disturbance would be less than alternative A, less impact to recreational quality.	**Long-term** - same as alternative B. **Short-term** - impacts on recreational quality less than alternative B; nonmining development could increase visitor use.	**Long-term** - past disturbance would affect many recreational attributes, but use of area is light; active mine viewing would not be possible; no major impacts. **Short-term** - none.
WILDERNESS VALUES			
Long-term - new disturbance would add to existing impacts from mining activities; any nonmining development would also add to existing impacts. **Short-term** - the sights and sounds of active mining would have an impact on wilderness values.	**Long-term** - same as alternative A. **Short-term** - same as alternative A.	**Long-term** - same as alternative A, except that the potential for nonmining impacts would be lower than for either alternative A or B. **Short-term** - same as alternative A.	**Long-term** - no new impacts would occur, and wilderness values would improve. **Short-term** - no new disturbance, disturbed areas would continue affect wilderness values.
LOCAL ECONOMY			
Long-term - no benefits from mining activity; nonmining developments could contribute to the local economy. **Short-term** - 3 to 12 employment opportunities and $15,750 to $69,750 in local expenditures.	**Long-term** - same as alternative A. **Short-term** - probable decreases in mining related employment and expenditures over those in alternative A.	**Long-term** - no benefits from mining activity; the potential for benefits from nonmining development would be lower than for alternative B. **Short-term** - probable decreases in mining related employment and expenditures over those in alternative B.	**Long-term** - no benefits from mining or nonmining activity. **Short-term** - loss of up to 12 employment opportunities and up to $69,750 in local expenditures.
PALEONTOLOGICAL RESOURCES			
Long-term - loss of stratified deposits and contained material from past mining. Future impacts would be avoided through scientific evaluation of deposits containing important paleontologic material. Nonmining development would add to existing impacts.	**Long-term** - same as alternative A.	**Long-term** - same as alternative A, except that the potential for nonmining impacts would be lower than either alternative A or B.	**Long-term** - loss of stratified deposits and contained materials from past mining. No new mining or nonmining impacts would occur.

Table 3. Comparison of Environmental Consequences Among Alternatives for the Fourth of July Creek Study Area

ALTERNATIVE A No Action	ALTERNATIVE B Proposed Action	ALTERNATIVE C	ALTERNATIVE D
WETLANDS			
Long-term - major loss of premining wetlands from past mining; new loss of 20 acres; reduced ecological value to aquatic and wildlife resources; any nonmining developments on patented claims could have major impacts. **Short-term** - same as long-term.	**Long-term** - major loss of premining wetlands from past mining; new loss of less than 20 acres; reduced ecological value to aquatic and wildlife resources; any nonmining developments on patented claims could have major impacts. **Short-term** - same as long-term.	**Long-term** - major loss of premining wetlands from past mining; new loss would be less than under alternative B; reduced ecological value to aquatic and wildlife resources less than alternative B; potential for nonmining developments less than under alternative B. **Short-term** - same as long-term.	**Long-term** - major loss of premining wetlands from past mining; no new loss of wetlands would occur. **Short-term** - none
AQUATIC RESOURCES			
Water Quality			
Long-term - altered water regimes, elevated metal concentrations, accelerated erosion and sediment transport, increased turbidity, lowered pH; nonmining developments on patented claims could have additional impacts. **Short-term** - potential for reduced flows and spillage of fuels and hazardous chemicals; no major impacts.	**Long-term** - potential impacts same as under alternative A, but of a lesser intensity. **Short-term** - same as alternative A.	**Long-term** - potential for altered water regimes, elevated metal concentrations, accelerated erosion and sediment transport, increased turbidity, and nonmining developments on patented claims would be less than under alternative B. **Short-term** - potential for reduced flows and spillage of fuels and hazardous chemicals less than under alternative B.	**Long-term** - altered water regimes, accelerated erosion and sediment transport, increased turbidity from past mining; no measurable evidence of hazardous material contamination or adverse effects on aquatic resources; no new impacts would occur. **Short-term** - some increases in sediment and turbidity may occur during reclamation.
Arctic Grayling Habitat			
Long-term - loss of 9.6% of premining habitat from past mining; new loss of 2.8%; major impact from cumulative loss of 12.4%; any nonmining developments on patented claims could have major impacts **Short-term** - new loss of 9.3% of premining habitat; major impact from cumulative loss of 18.9%.	**Long-term** - loss of 9.6% of premining habitat from past mining; new loss less than 2.8%; cumulative loss less than 12.4%; any nonmining developments could have major impacts. **Short-term** - new loss of less than 10.1% of premining habitat; cumulative loss of less than 18.9%	**Long-term** - loss of 9.6% of premining habitat from past mining; new loss would be less than alternative B; potential for nonmining impacts less than alternative B. **Short-term** - new habitat loss would be less than under alternative B; potential for nonmining disturbance lower than for alternative B.	**Long-term** - loss of 9.6% of premining habitat from past mining; no new impacts would occur. **Short-term** - some disturbance may occur during reclamation of acquired disturbed areas.

Table 3. Continued: Comparison of Environmental Consequences Among Alternatives for the Fourth of July Creek Study Area

ALTERNATIVE A No Action	ALTERNATIVE B Proposed Action	ALTERNATIVE C	ALTERNATIVE D
RIPARIAN WILDLIFE HABITAT			
Long-term - major loss of 6.7% of premining habitat during past mining; new loss of 20 acres; major impact from cumulative loss of 9.1%; any nonmining developments on patented claims could have major impacts. **Short-term** - 16 acres of new disturbance, major cumulative impact of 11.0% habitat loss; nonmining disturbance would add to impacts.	**Long-term** - major loss of 6.7% premining habitat during past mining; new loss of less than 20 acres, cumulative loss of less than 9.1% of premining habitat; any nonmining developments could have major impacts. **Short-term** - new disturbance of less than 16 acres, cumulative loss of less than 11.0% of premining habitat; nonmining disturbance would add to impacts.	**Long-term** - major loss of 6.7% premining habitat: new loss would be less than under alternative B; potential for nonmining impacts would be lower than for alternative B. **Short-term** - new habitat loss would be less than under alternative B; potential for nonmining disturbance lower than for alternative B.	**Long-term** - major loss of 6.7% of premining habitat during past mining; no new loss of habitat or nonmining impacts would occur. **Short-term** - some minor disturbance impacts would occur during reclamation of acquired mined sites.
PEREGRINE FALCON PREY HABITAT			
Long-term - 56 acres lost during past mining; 20 acres of new disturbance, cumulative loss of 76 acres, mostly low quality habitat; no major impacts; any nonmining developments could have major impacts. **Short-term** - 16 acres new disturbance, 92 acres cumulative disturbance, mostly low quality habitat; no major impact.	**Long-term** - 56 acres lost during past mining; new disturbance of less than 20 acres, cumulative loss of less than 76 acres; no major impact; any nonmining developments could have major impacts. **Short-term** - new disturbance of less than 16 acres, cumulative disturbance of less than 92 acres; no major impact.	**Long-term** - 56 acres lost during past mining; new disturbance would be less than under alternative B; potential for nonmining disturbance less than for alternative B; no major impact. **Short-term** - new disturbance less than under alternative B; no major impact.	**Long-term** - 56 acres lost during past mining; no new loss of habitat or nonmining impacts would occur; no major impact. **Short-term** - some minor disturbance impacts would occur during reclamation of acquired mined sites.
VISUAL QUALITY			
Long-term - 0.26% of premining landscape disturbed during past mining; 20 acres of new disturbance, cumulative disturbance of 0.33%; any nonmining developments of patented claims could have major impacts.	**Long-term** - 0.26% of premining landscape disturbed during past mining; new disturbance of less than 20 acres; cumulative disturbance of less than 0.33% of the premining, pristine landscape; any nonmining developments could have major impacts.	**Long-term** - 0.26% of premining landscape disturbed during past mining; new disturbance less than under alternative B; potential for nonmining impacts lower than under alternative B.	**Long-term** - 0.26% of pristine landscape disturbed during past mining; no new disturbance or nonmining impacts would occur.
CULTURAL RESOURCES			
Impacts would be avoided or mitigated through programmatic agreement with Alaska State Historic Preservation Officer and ACHP.	- same as alternative A.	- same as alternative A.	- same as alternative A.

Table 3. Comparison of Environmental Consequences Among Alternatives for the Fourth of July Creek Study Area

ALTERNATIVE A No Action	ALTERNATIVE B Proposed Action	ALTERNATIVE C	ALTERNATIVE D
SUBSISTENCE			
Long-term - some reductions in grayling, moose, and furbearer habitats; claims areas used very little for subsistence; no major impacts. **Short-term** - same as long-term.	**Long-term** - reductions in grayling, moose, and furbearer habitats would be less than under alternative A; no major impacts. **Short-term** - same as long-term.	**Long-term** - reductions in grayling, moose, and furbearer habitats would be less than under alternative B; no major impacts. **Short-term** - same as long-term.	**Long-term** - some reduction in grayling, moose, and furbearer habitats during past mining; no new impacts would occur.
RECREATION AND VISITOR USE			
Long-term - new and past disturbance would affect many recreational attributes, but use of the area is very small; active mine viewing would be enhanced; nonmining development could have major impacts. **Short-term** - same as long-term.	**Long-term** - same as alternative A except that fewer opportunities for active mine viewing would exist. **Short-term** - new mining disturbance would be less than alternative A, less impact to recreational quality.	**Long-term** - same as alternative B. **Short-term** - impacts on recreational quality less than alternative B; nonmining development could increase visitor use.	**Long-term** - past disturbance would affect many recreational attributes, but use of area is light; active mine viewing would not be possible; no major impacts. **Short-term** - none.
WILDERNESS VALUES			
Long-term - new disturbance would add to existing impacts from mining activities; any nonmining development would also add to existing impacts. **Short-term** - the sights and sounds of active mining would have an impact on wilderness values.	**Long-term** - same as alternative A. **Short-term** - same as alternative A.	**Long-term** - same as alternative A, except that the potential for nonmining impacts would be lower than for either alternative A or B. **Short-term** - same as alternative A.	**Long-term** - no new impacts would occur, and wilderness values would improve. **Short-term** - no new disturbance, disturbed areas would continue affect wilderness values.
LOCAL ECONOMY			
Long-term - no benefits from mining activity; any nonmining developments could contribute to the local economy. **Short-term** - one to four employment opportunities and $5,250 to $23,250 in local expenditures.	**Long-term** - same as alternative A. **Short-term** - probable decreases in mining related employment and expenditures over those in alternative A.	**Long-term** - no benefits from mining activity; the potential for benefits from nonmining development would be lower than for alternative B. **Short-term** - probable decreases in mining related expenditures over those in alternative B.	**Long-term** - no benefits from mining or nonmining activity. **Short-term** - loss of up to 4 employment opportunities and up to $23,250 in local expenditures.
PALEONTOLOGICAL RESOURCES			
Long-term - loss of stratified deposits and contained material from past mining. Future impacts would be avoided through scientific evaluation of deposits containing important paleontologic material. Nonmining development would add to existing impacts.	**Long-term** - same as alternative A.	**Long-term** - same as alternative A, except that the potential for nonmining impacts would be lower than either alternative A or B.	**Long-term** - loss of stratified deposits and contained materials from past mining. No new mining or nonmining impacts would occur.

AFFECTED ENVIRONMENT

INTRODUCTION TO PRESERVE ENVIRONMENT

The existing environment and surrounding area of Yukon-Charley Rivers National Preserve, and environmental aspects that have been affected by past mining or would be affected by future mining activities if the alternatives were implemented are discussed herein.

GEOGRAPHY

Yukon-Charley Rivers National Preserve is within the Northern Plateaus physiographic province in east-central Alaska (Alaska/Yukon-Charley Rivers National Preserve map). The preserve contains a portion of the upper Yukon River Valley, an area rich in historic, biotic, and geological features, and the entire 1.1 million-acre Charley River drainage, a complete drainage essentially undisturbed by modern man. The estimated area within the authorized boundary is 2,520,000 acres, about 2,207,000 acres of which is federal land.

The incised winding course of the Yukon River is the northern boundary for active placer mining in the preserve. South of the Yukon, steep walls rise to an upland, 800 to 1,200 feet above the river. The mined streams have cut narrow steep-walled valleys into this upland. The streams have low gradients except at their heads. The interstream areas are remarkably even-topped as they rise southward from the river. Ten to twenty-five miles south of the river, these flat-topped ridges are crossed by the Tintina fault. Here the terrain changes to one of strong relief with an intricate system of high ridges and spurs. Mount Sorenson and Twin Mountain are two of the highest peaks in the area and rise to just slightly above 5,600 feet. The highest point in the preserve is 6,435 feet.

Yukon-Charley is in the discontinuous permafrost zone for Alaska (USGS 1955). The presence and depth of permafrost in the preserve depends on climate, ground cover, soil composition, water circulation, and topography. Permafrost in Alaska is a product of both the present climate and of colder climates of the past. Formation of permafrost in many areas may have taken thousands of years, and is maintained by an annual air temperature averaging 9° F below freezing.

In Yukon-Charley, steep slopes, and coarse, permeable sediments or fractured bedrock favor water circulation, thus the presence of unfrozen zones. Active circulation of surface and sub-surface water promotes thawing and prevents formation of permafrost. Unfrozen areas at shallow depth are more common in mountains, especially south facing slopes, than in adjoining areas of low relief. At higher elevations, thick snow cover insulates the ground from deep freezing during winter and furnishes abundant melt water in spring to promote thawing of the seasonally frozen ground.

GEOLOGY AND MINERAL RESOURCES

The geology of the preserve can be divided into two basic rock assemblages which have very different characteristics. They are separated by the Tintina Fault zone, which trends southeast to northwest, and runs parallel to and 6 to 12 miles south of the Yukon River valley.

North of the fault zone, unmetamorphosed sedimentary rocks range in age from Upper Precambrian to Upper Tertiary. This sequence of sediments is highly inclusive of virtually all periods of geologic history with the exception of the Pennsylvanian period and some gaps within the Mesozoic era (USGS 1969). Sedimentary rocks north of the Tintina Fault contain oil shale in the vicinity of the Yukon River between the Nation and Tatonduk rivers. This same region may contain deposits of lead, zinc, copper, iron, and uranium (BOM 1978). Lignitic coal deposits exist in the vicinity of Washington Creek in the south-central portion of the preserve.

South of the fault zone lies a deformed sequence of regionally metamorphosed Precambrian to Cambrian sediments, volcanics, and intrusive bodies (USGS 1969). The region is considered to be a very favorable

MAPS

TRANSPOSED TO

END OF VOLUME

geologic environment for formation of metallic mineral deposits because of complex relationships between the metamorphosed sediments, granitic intrusive bodies, and extensive faulting (BOM 1978). Tin, tungsten, uranium, and other metals are suspected to be present in mineralized areas within the preserve and westward into the Circle, gold placer district (BOM 1978).

Placer gold is the only mineral in the Yukon-Charley region that has been exploited economically. The concentrated gold in the productive placers comes from several origins. Some of the nonmarine Tertiary deposits in the Tintina fault trench contain both disseminated and fossil-placer gold. Episodic movements within the Tintina fault zone have produced parallel branches and dialational fractures. Some of these fractures and faults are highly altered and contain epithermal minerals, including gold. Another source of gold is from present and past terrains lying south of the Tintina fault on its westward moving block. Lastly, the chemical behavior of gold in the weathering cycle of permafrost may have contributed to the placers (Watterson 1985). None of these sources are rich enough to be profitably mined until eroded, transported, and concentrated by natural forces. Thus, the gold in the present placers may stem from one or more sources.

CLIMATE

Yukon-Charley Rivers National Preserve is part of the great interior, ecological province of Alaska. Its climate is sub-arctic, semiarid and continental--a climate characterized by long, cold winters and by short but often rather warm summers. The rugged Alaska Range and the Tanana Uplands furnish nearly complete protection from the continuous stream of storms that sweep across the Gulf of Alaska. The Brooks Range to the north is effective against the winds that blow in from the ice floes of the Arctic Ocean. To the west, the Kuskokwim Mountains, Kokrines Hills, and Ray Mountains form a low, detached range that is usually effective in obstructing the tempering of the influence of the Bering Sea. Only when storms move up the coast of Siberia to a point north of the Aleutian Islands can they swing eastward up the Yukon Valley. On these few occasions, they produce heavy snowfall and mild weather and furnish some relief from the intense cold of winter.

In 1882 the Signal Service of the United States Army began a system of climatic observations at old Fort Reliance near Dawson, Yukon Territory, Canada, and at old Fort Adams near Tanana, Alaska. A volunteer, later under contract, also began observations at Belle Isle [Eagle] on the Yukon River. When Fort Egbert (established in 1899) was built at Eagle in 1900, the post surgeon became responsible for making weather observations. Observations began at Circle and at Fort Yukon in 1897. The following discussion is drawn mainly from records of the weather at Eagle as supplemented by other stations near the preserve that made observations from time to time over the years. The mined valleys of the preserve will have slightly different microclimates because of their topographic differences.

Summers are characterized by nearly continuous daylight for three months. The longest day is about 22 hours and 8 minutes and occurs on June 20 or 21. The sun is near the horizon long before sunrise and long after sunset. This is because its apparent path makes a small angle with the horizon at this latitude. This results in long periods of twilight in all seasons of the year.

Summer temperatures usually range between 37° to 72° F. The lowland temperatures often reach the low 90s because of the long days with typically clear skies. This also creates summer months with average temperatures that vary only a few degrees from year-to-year. Since 1882, a number of years at Eagle have had a record-high temperature of 95° F--usually in July. The average dates of the last and first freezes at Eagle are June 7 and August 21. Higher daytime temperatures give the Yukon-Charley Preserve about as many growing degree days as the Matanuska Valley near Anchorage.

Winds are generally light in the summer except for strong gusts near thunderstorms. Cool air moving down narrow valleys to replace rising warm air in the lowlands can cause katabatic winds. The sudden, unexpected appearance of these winds is more hazardous to low-flying aircraft than the strength of the winds.

During April, one of the driest months, the appearance of cumulus clouds signals the approach of the wetter summer season when more than half of the yearly precipitation will fall. With a range of 6 to 16 inches of rainfall a year and an annual average of 10 to 11 inches, the climate of the preserve is classified as semiarid.

Moisture laden storms empty their moisture as they rise over high mountain ranges which form barriers between the preserve and the coast. Because the preserve is in a topographic rainshadow, summer rains must rely, to a large degree, on moisture drawn into the sky from land and water bodies by convection currents. In summer, the deep layer of moss and decayed plants that blankets much of the area acts as a mulch which effectively holds moisture in the 2-foot layer of thawed ground. The soil is cool and damp beneath the insulating moss, evaporation is slow, and the humidity is high. The water vapor is carried aloft to join evaporation from muskegs and open water bodies. As the vapor rises on the warm air currents, it cools and condenses into cumulus clouds. By mid-afternoon, the sky can be filled with dark clouds and drenching downpours seem eminent. Instead of a downpour, however, the usual result is either a brief, light shower or steady light drizzle. Thunderstorms are common from early June until early August. Rains of less than 0.25 inches occurring on many days characterize the summer season.

Winter approaches rapidly with a pronounced cooling trend beginning in late August and early September. Temperatures approach 0° F, and the ice begins to run in the Yukon River by early October. The air is much colder than the yet unfrozen river, and water vapor drawn upward can create dangerous ice-fog conditions for light aircraft.

Winter temperatures usually range between -24° to +25° F. Record lows of -75° F have been recorded in more than one year at Eagle. Temperatures of -40° F may persist for several weeks as arctic high pressure systems stagnate over central Alaska. Winds are normally calm during the very cold weather. Lowlands and larger valleys are sumps for frigid air. During temperature inversions, low areas are often 20° to 30° F colder than slopes that are only a few hundred feet higher.

The winter month's average temperatures show the greatest variation from year-to-year compared to any other season. Thus, warmer annual temperatures are due-to-less cold winter months rather than warmer summers.

The preserve is just south of the Arctic Circle, so even in late December, the sun never remains below the true horizon at noon. However, mountainous areas to the south of the streams being mined and steep valley walls block direct sunshine for several weeks in midwinter.

The lower elevations of Yukon-Charley average about 15,000 heating degree days each winter. This persistent cold allows a single winter's frost to penetrate 7 to 8 feet through thawed gravel. The ice in the streams usually freezes to a thickness of three or four feet, depending upon the amount of insulating snow that falls early in the season. Ice sometimes measures nine feet or more in pools created by mining because there is no current. If the streams have sufficient discharge, they will often break through the ice and flow on top of it and the adjacent floodplain. Ice formed on the land in this manner is aufeis. If formed in sheltered areas, such as north-facing banks, the aufeis may remain through most of the summer.

The preserve has an annual snowfall of 52.5 inches at lower elevations. The snow is light and dry due to the extreme cold. From November through April, 10 inches of snowfall will average only 0.65 inches of water. There are times when the fine, dry snow falls continuously for several days, yet the accumulated depth is scarcely more than a trace.

The Clean Air Act (PL 91-604) classifies the preserve as a Class II airshed. This classification allows for some air quality degradation from existing conditions. Minor amounts of emissions from burning fuels or operating engines can cause local pollution in the winter. This condition may result from extended periods of strong temperature inversions with little or no winds.

TRANSPORTATION AND ACCESS

There are no major roads within the preserve boundaries. The Taylor Highway terminates at Eagle about 12 river miles south of the preserve boundary, and the Steese Highway terminates at Circle about 14 river miles north of the preserve. Access to the preserve is primarily accomplished by boat, aircraft, or overland winter travel. The only overland access by mechanized vehicles allowed is snow-machine travel.

Four existing airstrips are at Woodchopper Creek (on private land), Coal, Ben, and Fourth of July creeks. These airstrips are used periodically but are undeveloped and unmaintained. Access for many recreational activities, such as sport hunting and the limited amount of sportfishing, is accomplished by small fixed-wing aircraft landing on gravel bars.

Several types of access are used to get to mining claim areas in the preserve. Access to inholdings in the preserve is controlled by provisions of access regulations at 43 CFR 36. Each claim area is near an airstrip. Most of the claim groups can be reached by existing roads or trails from the Yukon River. The drainages containing claims are crisscrossed by equipment trails made over the past few decades, mostly with bulldozers; although, while still readily evident and visible, many of these trails are now overgrown by vegetation. Movement of equipment to and from mining claims in the preserve has been accomplished in three ways. The first is through the use of a long winter trail originating at Circle Hot Springs. Caterpillar tractors can usually safely travel this route in winter when the ground is frozen and can support heavy loads. The second way is to move smaller pieces of equipment by breaking the machinery down and flying it in piecemeal to the mining site in a light airplane. Providing the mining camps with provisions is often done by airplane as well. The third technique is to barge equipment or move equipment on the river ice along the Yukon to the mouth of the drainage being mined.

The Woodchopper mining camp has a 4,500-foot gravel, private airstrip. A mining road within claim boundaries connects the camp to the Yukon river 7.4 miles to the north. A 6-mile mining road over federal land connects the Woodchopper Creek claims with former Coal Creek claims.

A mining road connects upper Coal Creek to a barge landing at the Yukon River. A mining trail leads up the canyon to Discovery Creek. A 4,200 foot runway, built on dredge tailings in the lower part of the canyon, provides access to this area.

Ben and Sam Creeks are reached by a 2,500 foot Ben Creek airstrip.

The Fourth of July claims are linked to the Yukon by an 8-mile long road that is not maintained and is now overgrown with vegetation. A tailings airstrip, that is not maintained and in poor condition, is on the Fourth of July claims.

LAND STATUS AND USE

Yukon-Charley National Preserve, though largely federally-owned, contains extensive nonfederal inholdings. Currently, there are seven general categories of actual or potential, nonfederal land-ownership within the boundaries of the preserve: native regional corporation; native village corporation; native allotment; small private tract; patented mining claim; unpatented mining claim; and state-owned, submerged land. At this time, these lands remain unimproved except for a few log cabins, but some of the mining claims, where mining activities have taken place in the past, have more extensive facilities.

The Alaska Native Claims Settlement Act of 1971 (ANCSA)(PL 92-203) allowed for selections of public land by native Alaskans through regional and village corporations. Most of these are in the northeastern portion of the preserve within the Nation, Tatonduk, and Kandik river watersheds. The village corporation lands and native allotments have not yet been conveyed, and the federal government remains the interim manager until conveyance by the Bureau of Land Management.

Doyon Limited, the native regional corporation, owns approximately 390,000 acres. Hungwitchin, the village corporation, owns 26,836 acres in the southeast corner of the preserve just north of Eagle City. Private lands (other than native corporation lands) are at Miller camp, near the Nation townsite, at the Woodchopper mine, and near Twenty-eight Mile (upstream from Circle on the Yukon). These lands are all subject to development by private owners.

There are placer gold mining claims in the drainages of Woodchopper, Coal (Boulder Creek), Sam, Ben and Fourth of July creeks. Table 4 lists existing mining claims in the preserve.

Table 4. Existing Mining Claims in Yukon-Charley Rivers National Preserve

Drainage	Claims	Acres	Status
Woodchopper Creek	15	233	patented
Woodchopper Creek	113	3,780	unpatented*
Iron Gulch	6	200	unpatented
Mineral Gulch	9	200	unpatented
Boulder Creek	5	100	unpatented
Sam Creek	6	120	unpatented
Ben Creek	15	300	unpatented
Fourth of July Creek	11	220	unpatented
Total	180	5,153	

*some claims overlap

HISTORY OF MINING IN THE YUKON-CHARLEY RIVERS AREA

Protecting and interpreting historical sites and events associated with the gold rush on the Yukon River were among the reasons for establishing Yukon-Charley Rivers National Preserve in 1980 (ANILCA [PL 96-487] sec. 201[10]) (appendix 5).

Early Mining History

The first recorded prospectors arrived in the upper Yukon region in the 1880s. Southeast of the present day preserve, prospectors found coarse placer gold in 1887 on Fortymile Creek in American territory. This was the beginning of the Gold Rush to the Yukon River. In 1895 placer gold deposits were discovered in the basins of American Creek and the Seventy-Mile River. By 1898 claims were staked on Mission and Fourth of July creeks. Within a few years, most of the creeks in which there has been mining were staked. These drainages formed the core of the Eagle mining district. Total production of placer gold through 1960 was about 45,000 fine ounces.

In 1862 Robert McDonald, a Church of England Archdeacon, founded a mission at Fort Yukon. Although renowned for translating the Bible into an Athabascan language, he is also credited to be the first to report gold in the Yukon drainage of interior Alaska. Many have searched for "Preacher Creek", but it is now believed to be the present Mastodon Creek where Sargi Cherosky and Pitka Pavaloff made their strike in 1892 west of the preserve. By 1896 most of the principal gold-bearing streams in the newly formed Circle mining district had been staked and were being actively mined. Total production of placer gold in the district through 1984 was about 200,000 fine ounces.

The great Klondike gold rush of 1896 brought thousands of gold-seekers to the Yukon territory, and some of these men moved down the Yukon to prospect in American territory. Those who prospected the north-flowing tributaries in the Yukon-Charley region found profitable placer deposits on Fourth of July, Ben, and Mineral creeks in 1898. Returns of $0.60 per gold pan were reported in 1898 from the Charley River basin at Todd Creek. Almost all of the streams of the present day preserve that eventually yielded profitable gold placers had claims staked on them by 1901.

Early Mining Methods

One of the early mining methods employed in the Yukon-Charley Rivers area was drift mining. This method of mining, like all of the early mining techniques, was simple and was accomplished with hand tools. First, a small area was stripped of brush and moss. Then pick and shovel were alternated with fire to sink a shaft through the permafrost to bedrock. Paystreaks of gold, if found, were usually near the contact between bedrock and gravel. If gold was not found in paying amounts, the shaft was abandoned and another started in a more favorable location. After the shaft was abandoned, the exposed permafrost slumped into the opening. Solifluction and natural revegetation occurred later, leaving little evidence that a shaft had existed.

Paystreaks were pursued by means of a lateral "drift" (adit), or an open cut. The gold-bearing gravels were mined during the winter and dry periods of summer when water was not available. Pay gravels were stockpiled and then washed in a sluice or rocker box in the spring or after summer storms when an adequate water supply was available. If a substantial water flow could be obtained and there was an adequate bedrock gradient, ground sluicing (excavating gravel by water not under pressure, such as with a boomer dam) was another placer mining method that was used.

The miners also used small boilers to thaw frozen gravels by driving points (hollow steel pipe) into the ground and forcing steam through them. Another early use for steam was a steam-powered dragline that operated on Fourth of July Creek in 1911. This dragline was the only large piece of equipment to be used for gold-mining in the Yukon-Charley area until the mid-1930s.

Hydraulic mining was also used on Fourth of July, Ben, Mineral, and Boulder creeks in the early years. This method utilized powerful jets of water to wash away the overburden and push the paydirt into sluice boxes. Water pressure for hydraulicking was created when water was piped down hill through progressively smaller sizes of pipe and then through a constricting nozzle called a giant. The force of the water was then used to strip muck and sterile gravel from the pay gravels, direct the pay gravels into sluices, and stack tailings away from the foot of the sluice boxes.

Recent Mining in the Yukon-Charley Rivers Area

Coal Creek. Large-scale placer mining in the Yukon-Charley Rivers area became feasible for the first time after the federal government raised the price of gold to $35.00 per fine ounce in early 1934. In the fall of that same year, General A. D. McRae of Vancouver leased all of the claims in the Coal Creek valley up to Colorado Creek. These consolidated placer claims extended for seven miles and consisted of two main claim groups. The lower Beaton and Nelson claims extended for 25,000 feet along Coal Creek from the Yukon River to the mouth of Boulder Creek. The upper or Frank Slaven claims covered the next 16,000 feet to a point several thousand feet above Colorado Creek. These two groups covered practically the entire valley bottom.

Ernest N. Patty, who directed the mining operations for McRae, conducted an extensive exploration program of churn drilling and test pits. Based on early test results, McRae ordered a bucket-line floating dredge in the spring of 1935 from the Walter Johnson Company of San Francisco. During the summer, a camp was built on skids and a dredge pit was dug nearby. A tractor-haul road was constructed from the pit to the Yukon River, a distance of 6.5 miles. A 2-mile long ditch was dug and pipeline with 90 feet of head (a measure of water pressure) was also built. The crew also stripped vegetation and muck over the greater portion of the land that was to be mined by the dredge during the following year.

In August of 1935, McRae and Patty incorporated the operation under the name Gold Placers, Inc. The dredge components arrived in October, and they were transported to the dredge pit by March for assembly. The 62 bucket-line dredge was operating by July 1, 1936. Each bucket had a capacity of four cubic feet. The dredge had a maximum capacity to process about 3,000 cubic yards of gravel each day.

The ground ahead of the dredge was prepared for mining by cutting the trees and bulldozing the brush and mat of moss and tundra. Removal of this insulating cover exposed an underlying mass of shiny-black muck, composed of frozen mud, silt, and decayed organic matter replete with ice seams. This layer of muck on Coal

Creek ranged from 6 to 28 feet deep, averaging about 8 feet. The muck was removed inexpensively by cutting drains and sweeping the muck into them with jets of water from 8 two-inch Joshua Hendy hydraulic giants. The drains sloped into Coal Creek; the creek was turned black from the sediments. The small particles and organic nature of the muck flowed rapidly into the Yukon River. Over the past 50 years, the Yukon's sediment burden has been increased by an estimated four million cubic yards from mining operations on Coal Creek.

As the muck was removed and patches of gravel began to appear, the miners often found skeletal remains of animals. Some of the bones still had bits of flesh and hide clinging to them, preserved by the permafrost. Ancient beaver dams and stumps of trees, still upright and rooted in the gravel, were also found. If the muck extended to a level too low to be washed away, it was removed by the dredge. When this occurred, the tailings would often give off the stench of decay, and off-duty miners would prospect the sites for pieces of fossil ivory.

In the early years of operation, the muck-stripped areas were close to the operating dredge. The frozen gravels were thawed by driving 10 foot lengths of heavy steel pipe into the gravel and forcing steam into them. As the stripping out-paced the dredge, some of the gravels warmed naturally and water under pressure replaced the steam. Once the stripping process advanced to a point two seasons ahead of the dredge, the gravels thawed sufficiently from solar radiation.

The Coal Creek dredge operated while floating in a bulldozer-excavated pond. It moved upstream or downstream by digging up to 14 feet of gravel in front and dumping the tailings out the back. The dredge could pump about 4,800 gallons per minute from the pond to separate the gold from the gravels. To prevent excessive mud build up and to maintain the pond level, muddy water was pumped from the pond and replaced with fresh water at a rate of about 1,000 gallons per minute.

The gravel being mined was a mixture of sand, pebbles, and cobbles up to six inches in diameter. Just above bedrock, the clast size increased with a few reaching the size of small boulders. All material larger than pebbles was separated by the dredge trommel and sent to the stacker on conveyor belts to be dumped as tailings. The stacker had to be long enough to pile the coarse tailings far enough from the dredge so that they would not interfere with operations. The smaller volume of finer material could be dumped closer to the dredge after gold removal.

After the United States entered World War II, the federal War Production Board issued Limitation Order No. L-208 in October of 1942 declaring gold mining to be nonessential to the war effort. This closed down most of the gold mining operations in Alaska, including the dredge at Coal Creek. After the war, Gold Placers, Inc. resumed dredging on Coal Creek. The company operated a total of 17 years between 1936 and 1957, recovering 92,385 ounces of gold and 9,514 ounces of silver.

In 1961 the dredge and properties were leased to Ted C. Matthews of Fairbanks. Insufficient land had been prepared ahead of the dredge, so vegetation stripping and muck hydraulicking were performed that summer while Matthews operated another dredge on Woodchopper Creek. Matthews operated the Coal Creek dredge from 1962 through 1964. However, the operating costs increased as the amount of gold recovered per yard of gravel declined. Incomplete records indicate a production of about 6,350 ounces of gold and 570 ounces of silver during the years Matthews operated the dredge.

There is no record of mining from 1965 through 1972; the latter year, the properties were sold to Ernest Wolff, D. Cobin, and W. Sothen. The price of gold was deregulated in the United States in 1972. As the value of gold rose sharply, gold mining once again became an attractive proposition. Wolff, Cobin, and Sothen conducted open-cut mining on the Coal Creek claims using bulldozers and sluice boxes. In 1973 they started operating the dredge. They dredged for only a short time that season because of lack of stripped gravels. The dredge operated again in 1976 for a short period of time. The total amount dredged by this operation did not exceed 10,000 cubic yards. Recovery figures are not available for the Wolff, Cobin, and Sothen operation.

Lomerson, Ltd. (AU Placer, Inc.) purchased the properties in 1977 and carried out open-cut mining by using two bulldozers to feed elevated sluices. The company used a front-end loader to remove and stack tailings. Twenty-five people were seasonally employed in 1977. In July 1985, the properties were acquired by a joint venture called Coal Creek Mining Properties. A crew of 12 to 25 used heavy equipment to strip pay gravels and to feed the recovery sluices. Mining activities ceased in October 1986 and the land was donated to the National Park Service. Full production figures for the last mining operation are not available, but are estimated at 2,000 to 4,000 ounces of gold per season.

In upper Coal Creek, small mining operations occurred in the area of Discovery Creek from 1911-1935 and again in the late 1970s. What remains are two old collapsed cabins, bulldozer trails going up both sides of creek, numerous scraped areas in of different ages in flood plain gravels, some abandoned 55-gallon drums and other trash. Most of the disturbed area is thickly revegetated, but there is much down timber and some erosion and slumping. About a mile below Discovery Creek are two shafts filled to within 3 feet of their collars by water. Present too are the remains of a cabin, barn, blacksmith's forge, and an old ditch west of the site. Downstream from the campsite, AU Placer, Inc. cleared 6,000 square feet of vegetation and soil. On the south side of the clearing a dozer cut exists, is water filled, and was done about 1979 by Delbert Booth.

On Patterson Creek there are old trails and 1977 bulldozer trails, and four or five old collapsed cabins and one still standing. The more recent trails are not deteriorating.

There was intermittent, small scale mining in lower Colorado Creek from 1905 to 1946. The gold was often coarse and nuggets up to half an ounce have been found. Miners would often snipe the bars after floods for this coarser gold. Slugs of gold were found on the tributary of Rosebud Creek (a.k.a. Rose) but their source could not be located. The reported production from Colorado Creek in 1946 was 49 troy ounces of gold and 1 troy ounce of silver.

All of Boulder Creek fell under an association claim as early as 1908. In 1914 Alexander B. Macdonald claimed No. 2 Below Discovery and sank two shafts in 13 days.

Martin Adamik began mining his claims on Boulder Creek in 1918. Because it is a narrow gulch placer, he used drift and hydraulic methods to mine both bench and stream gravels. The stream gold was bright and flaky with a fineness of 909.5 while the bench gold was shotty and tarnished with manganese. The source of the gold appears to be in the normal-fault contact zone between Tertiary conglomerate on the north and quartz stockworks in Permian conglomerate on the south. Adamik's last year on the claims was 1943. Total production to that time was 88 troy ounces of gold and 11 troy ounces of silver from 6,030 cubic yards of gravel. Production reported by all miners prior to 1951 was 334 troy ounces of gold and 42 troy ounces of silver.

James Layman restaked the older workings in 1962 and 1963 and then sold them to Frank Hall in 1971. Hall worked claim Nos. 1 and 2 Above Discovery with an open-cut dozer operation and prospected on the bench with a four-inch drill rig.

Woodchopper Creek. In the summer of 1935, Gold Placers, Inc. optioned existing claims on Woodchopper Creek with a view toward conducting dredge operations similar to those on Coal Creek. Ernest R. Patty staked additional claims and conducted exploration using test pits. A rich body of gravel was discovered on a low bench that had been missed by earlier prospectors. A good, six mile-long caterpillar road was constructed over the ridge to the Coal Creek operation to bring a churn drill and supplies to Woodchopper Creek. Churn drilling was conducted until November. After development work disclosed that there were valuable placer deposits on Woodchopper Creek, the options and new claim locations were turned over to Alluvial Golds, Inc., a sister company to Gold Placers, Inc.

The property held by Alluvial Golds, Inc. included nearly the whole width of the valley floor from Mineral Creek to above Iron Creek, a distance of about three miles. In 1936, a dredge similar to the one on Coal Creek was ordered, a camp was constructed, and ground preparation and muck stripping begun. The dredge parts were hauled from the Yukon River in April 1937, and the 72 bucket dredge became operable on July 6, 1937. The dredge was operated until it was shut down during the war. Dredging resumed after the war until 1960. Alluvial Gold, Inc. operated the dredge for 16 seasons and recovered 83,841 ounces of gold and 6,080 ounces of silver.

Ted Matthews of Fairbanks leased the dredge and mining claims on Woodchopper Creek in 1961. Matthews operated the dredge during 1962 and mined downstream from the end of the airstrip for about a quarter mile of the dredge. During that year, the dredge processed 340,000 cubic yards of gravel and produced 3,375 fine ounces of gold and 308 ounces of silver.

Joe Vogler of Fairbanks purchased the patented and unpatented claims of Alluvial Gold in 1971. He staked 29 additional 40-acre claims on upper Woodchopper Creek in 1973, and 30 more 40-acre claims in 1976. Vogler did a small amount of mining at the mouth of Iron Creek, but most of his mining activity has been on Mineral Creek.

Although most pre-1935 mine works in the main valley of Woodchopper were consumed by later dredge operation, the remains of old workings can be found along the base of the bench on either side of the mouth of Green Gulch.

Claims were staked on Mineral Creek as early as 1898, but mining did not begin until some years later. Most of the early mining was concentrated close to the mouth of, or in, Alice Gulch. By 1906 eighteen men were mining seven claims mostly by shoveling in methods, but one small hydraulic plant was used for stripping and three steam hoists were operated. About 80 percent of the mining was done in winter and gravel stockpiled for sluicing in the spring. Most miners used steam points for thawing gravel. Production in 1906 was estimated at 870 troy ounces of gold. By 1935, incomplete returns indicate that the total production from Woodchopper Creek and all of its tributaries since 1898 was 20,000 ounces of gold, 12,000 of this from the old shallow diggings on Mineral Creek.

Alluvial Golds developed Mineral Creek in 1938 with 92 drill holes in 12 lines. The holes were usually about 15 feet apart and the lines were spaced 300 to 1,200 feet apart. This testing indicated 258,300 cubic yards of gravel containing $0.825 of gold per yard based on a price of $35 per ounce overlain by 143,900 cubic yards of muck. This averages out to 1 ounce of gold for every 66 cubic yards of muck and gravel removed from an area covering 8.9 acres.

In recent years, Joe Vogler mined the creek by using a trommel and front-end loader. Sluice water comes from an upstream dam which stores about 1,000 gallons of water.

Iron Creek was first staked in 1901 by John C. Boyle. Almost all of the early century work was intermittent drift mining. In 1926 production was reported as 9 troy ounces of gold and 1 troy ounce of silver. A few slumped drifts and collapsed cabins with adjacent middens are all that can be recognized from this period of mining. Joe Vogler, the present claimant, performed a small amount of prospecting and mining here in 1979 to 1981, but he has mainly concentrated his efforts on mining his Mineral Creek claims.

Ben and Sam Creeks. Sandy Johnson began prospecting on Sam Creek in 1888, and he built a cabin at the mouth of the creek. Johnson sank several shafts in search of placer gold until he discovered gold on nearby Ben Creek. In 1921, Johnson used a Little Giant to hydraulically mine 1.5 acres of ground near Ben Creek.

In July 1927, Arthur Reynolds moved to a tent camp on Ben Creek. Between 1927 and 1935, Reynolds staked four claims between Ben Creek and Ruby Creek, and built two cabins on Ben Creek. He also constructed a ditch on Ben Creek, and started constructing a dam. Reynolds ground sluiced during those years, used water from the ditch, and he dug a prospect hole above one of the cabins. He continued mining in the area until 1944, but there are no records of his specific activities for the years after 1936.

Martin Adamic and Adolph Biederman staked No. 1 Discovery claim on Sam Creek on July 4, 1935. Sandy Johnson sold his Ben Creek claims to Barney Hansen in 1944. Hansen worked the claims only in 1959. He constructed an airstrip on the ridge between Coal Creek and Ben Creek and on roads leading to the claims. J. R. Layman purchased the Ben Creek claims in 1961.

The amount of water in Ben Creek is limited. Consequently, a boomer dam has been built to store and control water for sluicing. During runoff, the reservoir takes about half an hour to fill, and when released, passes through a ditch to sluice boxes set on bedrock. In 1965 production was reported as 26 troy ounces of gold and 2 troy ounces of silver.

Fourth of July Creek. The 1898 gold rush to Fourth of July Creek occurred when frustrated prospectors moved into the area looking for gold-bearing streams that had not already been staked extensively. The first claims on Fourth of July Creek were staked on the left fork in June of 1898 by a man named Crowley, who named the entire creek after himself. An Indian told some men at Circle City about Crowley's activity on the creek, and at least a dozen men hustled to the creek to prospect. They renamed the creek for the day that they staked the discovery claim at the mouth of the left fork, which they named Crowley Creek.

Within 10 days, Fourth of July Creek was staked from claim No. 10 Above Discovery to claim No. 10 Below Discovery. The miners held a meeting to draw up laws to regulate mining activity and to appoint a recorder. Under the rules of the new mining district, miners could file only one claim and they were prohibited from staking claims for others. Miners were charged $2.50 to record a claim, and they were permitted to buy claims from other miners. By the end of the summer, more than 100 claims (20,000 acres) had been staked and a town called Nation had been established.

Within two years, most of the "boomers" on Fourth of July Creek had sold or abandoned their claims and had joined rushes to other gold fields. Some of the more promising claims were purchased by James Taylor. Approximately ten miners were working claims on the creek in 1904, and that number dropped to six by 1906. Production on the creek between 1898 and 1906 was estimated at $25,000 to $30,000. On August 24, 1907, Arthur Reynolds staked a bench claim between Mystic Creek and Union Gulch. He obtained 70 ounces of gold worth $1,400 (at $20.67 per ounce) by ground sluicing an open-cut on this bench claim.

In the summer of 1911, James Taylor introduced the first piece of heavy equipment to the area. Taylor brought a steam-powered Bagley scraper which traveled 10 miles under its own power up Fourth of July Creek. The scraper was pulled forward by attaching cables to hooks which sunk into the frozen ground. By pulling itself forward on its foundation of log skids, the scraper averaged 0.5 miles per day through the brushy valley floor. The 86 horsepower scraper began operation during the first week in September. Plans were to use it extensively the following year.

During the early years of mining on Fourth of July Creek, many of the miners built cabins on their claims so they could work year-round. Supplies from outside had to be purchased with cash. A large portion of the miners' livelihoods came from subsistence hunting, fishing, and gathering activities, as well as from trading goods and working for other miners. Some work for other miners was done for cash, but often it was done on a basis of an exchange of work.

By the early 1920s, James Taylor had consolidated the most productive claims on Fourth of July Creek above the mouth of Union Creek. He channeled water out of the creek into a ditch, which carried the water around the bench, over a tressel and flume, and down to his sluice boxes. About 1924, Taylor sold his holdings to Cedro Wooly, who hired George Matlock to run the mining operation for him. The name of this venture was the July Creek Placer Company. Matlock built a nine mile ditch to augment the water supply for hydraulic operations. The ditch ran from "Little" Washington Creek to Ruby Creek at the head of Fourth of July Creek. The new ditch, unfortunately, carried water only during a heavy rainstorm. On May 24, 1925, the July Creek Placer Company optioned the property to Casper Ellington, who worked for B. D. Vanderveen, for a purchase price of $142,000. One of the conditions of the option was that the new owner install a dredge. In September, Ellington purchased claim No. 9 Above Discovery from John Starr for $1,000 and claim Nos. 10 through 20 Above Discovery from the July Creek Placer Company for $2,000. Richard Bauer optioned claim Nos. 5 through 8 Above Discovery to Ellington for $1,500 in November.

The new holder of the claims failed to install a dredge. On August 29, 1929, Richard Bauer bought the July Creek Placer company for $30,000. The company had been mining the west half of claim Nos. 11 and 12 Above Discovery. Bauer concentrated his efforts on these claims for the next seven years with a crew of four or five men. Water was provided by a 2.5 mile ditch that ran along the eastern side of the valley and produced a head of 165 feet of pressure. When the water supply was sufficient, three giants with 2.5-inch nozzles were used to expose the gravel for thawing and to sweep gravel into a line of sluice boxes. A fourth giant was used to stack tailings. Lack of water was a constant problem, especially in the early part of each season.

By 1935 Bauer had the largest mining camp in the Eagle area. The fineness of the recovered gold declined, however. So on August 20, 1936, Bauer sold the claims to Casper Ellington for $25,000. Ellington leased the claims to the Central Mining Company and was employed as manager of the operation. This camp remained the largest in the Eagle area until the war efforts forced the camp to close in 1943. Production prior to 1939 was reported at 6,624 ounces of gold and 736 ounces of silver.

After the war, the property was purchased by Yukon Placers. The greatest utilization of hydraulic mining took place in this post-war era. Yukon Placers brought in heavy equipment and built a road from the Yukon River to the claims. Mining was conducted by hydraulicking and bulldozers. Production figures for 1948 are not available, but in 1949, production consisted of 1,372 ounces of gold and an unknown amount of silver. The mine reported substantial gold production in 1950 and 1951, but this was the last year of operations because of high production costs.

James R. Layman staked new claims on Fourth of July Creek in 1964. His discovery claim is close to the abandoned No. 10 Above Discovery claim. Layman mined sporadically over the years, using as many as two bulldozers and a backhoe to feed a small washplant. He used a small suction dredge in 1981. The only recorded production from this small one- or two-man operation was four ounces of gold in 1982.

Ruby Creek is a tributary of upper Fourth of July Creek. Ruby Creek was mined in the early 1900s, but a limited amount of specific information about mining activity on the creek during that period is available. On July 26, 1907, Arthur Reynolds and William Noyes each staked a claim on the creek. Considerable mining activity occurred on Ruby Creek during the summer of 1911. Open cut methods were used because the bedrock was less than 15 feet below the surface. Gold was found on the lower 20 inches of the gravel above bedrock. Values of $50 to $75, per sluice box length of 12 feet by 12 feet were reported. New productive ground was found on Ruby Creek in 1912 and 1913. Despite the good showings, however, mining operations were frequently interrupted by a lack of water. Production for 1926, the only year in which such information is available, was five ounces of gold and one ounce of silver. There are no valid mining claims in the Ruby Creek drainage.

Flume Creek. Interest in mining in Flume Creek began just below its mouth on the Seventymile. There, in the spring and early summer of 1898, bar claims were staked by Adolph Norman, Thomas Anderson, R. R. Michael, Ino Barnes, M. E. Dolan, and E. Hartshorn. By using simple tools ranging from pan to rocker box, they skimmed small pockets of gold left behind by the river's natural sorting and concentrating abilities at high flow.

Erwin A. Robertson crossed the Chilkoot Pass and reached the mouth of Flume Creek in the fall of 1898. Armed with rifle, pick, gold pan, shovel, and a little outfit, he intended to reap $1,000 in gold to develop and patent his ideas for a powered flying machine. Less than a mile from the mouth, he found good colors in the stream and a mineralized zone of small quartz and carbonate stringers. Modern assays indicate the presence of about 0.25 to 0.30 ounces of gold and .04 ounces of silver per short ton of ore. Others were staking claims and prospecting the creek as far up as the small tributary of Arctic Creek where Art Frolich also found placer gold that year.

Just after New Years of 1901, Bert Bryant hiked to Arctic Creek to stake a claim for a man who paid him $50 to do it. By 1904 he was working with Robertson on Flume Creek to develop a lode mine on what was now called the Caribou Ledge. They constructed a water-powered arrastre to crush the ore for testing. Five tons of ore were crushed and $40 in fine gold was collected. Encouraged, they completed the first 66 feet of what was to become a 100-foot mine tunnel by 1914. The vein did not prove rich enough to develop without adequate transportation, so Bryant moved on to prospect elsewhere.

He intermittently mined his claims until the mid-1930s. Flume Creek was a favorite of local prospectors because some of the gold was coarse and nuggets of considerable value were reported. A flurry of prospecting occurred in March of 1912 when about 200 feet of holes were sunk in the creek and a high, gravel-covered bench to the west about 3 miles above the mouth of Flume Creek. There are no reported production records for the creek and the last year of active mining was 1935.

Two cabins and a clapboard workshop near the mouth of the creek are the only obvious remains of old mining operations. The area is under application by Doyon, Ltd. There are no valid mining claims in the Flume Creek drainage.

Washington Creek. Lignitic coal was discovered on Washington Creek in 1897 by N.B. Labrie. He turned the location over to the Alaska Coal and Coke Company. F. A. Steiger of Vacaville, CA, surveyed a 10-mile railroad centerline for the company up Washington Creek to California Creek in the summer of 1902. The railroad was not built. In 1905-1906 the company made another attempt at developing a coal transportation system to the Yukon. A 20-foot-wide haul road was cut to the mines from the Yukon; five

10-ton capacity sleds were constructed; and a 100-horsepower steam tractor was imported to pull them. Without a good road bed, the coal could only be hauled in the winter. About 5 tons of coal were mined that would reach the river. However, the coal contains considerable sulphur, produces many clinkers, and slacks readily when stored and exposed to air. It was a poor fuel for steamboats, and without this market, the company soon went bankrupt.

Placer gold was found in 1903 at Nugget Gulch on Washington Creek. It consisted of very much localized accumulations of coarse gold on Cambrian argillite bedrock. Production through 1938 was 1,772 troy ounces of gold and 302 troy ounces of silver from these scattered deposits. The largest nugget reported from the Washington Creek drainage was worth $167.50, a little more than 8 troy ounces. There are no valid mining claims in the Washington Creek drainage.

Charley River. The Charley River and many of its tributaries have places where a little panning will produce a few gold colors. In 1898-1899, there were more than 75 miners working in this drainage basin. However, physical or historical evidence of mining activity is present at only a few locations.

In 1903, Bert Bryant and Jim Hudson staked lode claims on a copper and gold mineralized zone that they found about a mile downstream from the confluence of Godge and Copper creeks. A large cabin was built on the claims in 1904 and 114 feet of tunnel was completed by 1905. Their best copper specimens were evaluated by a mining engineer, Mr. Bratnober, who pronounced them of good grade but "too far away and we had best forget it". About a mile below their cabin, on the north bank of Copper Creek are two very old placer cuts made by unknown parties.

In 1936, Gold Placers, Inc., test drilled on the north bank of lower Bonanza Creek and the west bank of the Charley River at and below its confluence with Bonanza. The 63 holes indicated gold values to be present but far too low in grade and too inconsistently disbursed for dredge mining.

There are no valid mining claims in the Charley River drainage.

Weber Creek. Some exploration mining occurred in the east fork of Weber Creek after the turn of the century, and Gold Placers Inc. did minor test drilling on the main creek in the mid-1930s with discouraging results. A very limited amount of mining has been done on Alder Creek just above its junction with Weber Creek, but the entities are unknown.

The clearest evidence of past mining activities on this creek are near its mouth. In 1975 two would-be miners built a cabin on Weber Creek and bulldozed a road to the creek. They left behind the unroofed cabin, the bulldozer road, and two pickup trucks. There are no valid mining claims in the Weber Creek drainage.

Nation River. In 1897 the Alaska Commercial Company opened a coal seam of the east bank of the Nation River about a mile upstream from the Yukon. About 2,000 tons were mined, sledded to the Yukon, and burned on river steamers or transported to the Dawson market. By 1902 the effort had been abandoned and, by 1903, the mines had caved in. Remains of this mining activity are a cabin depression, a short stretch of sled road used to haul the coal, and a stockpile of coal abandoned with the mine. Residents of Nation scavenged some of this stockpiled coal for heating and blacksmithing. Valid mining claims are not in the Nation River drainage.

MINERAL DEVELOPMENT SCENARIO

A mineral development scenario was developed to predict future placer mining sites in the future (assumed to be a ten year period). The scenario does not represent an NPS proposal, nor does it suggest levels of mining activity which are either acceptable to the National Park Service or approvable under existing regulations. It is a hypothetical scenario to be used for analysis purposes only.

Future activity is not expected to occur on all claims (appendix 6). On those areas where activity is anticipated, the scenario developed for that situation represents the type of activity that is most likely to occur. The amount, type, and age of past activity are considered to be of primary importance in anticipating future activity. For the areas in which future mineral activity is projected, it is assumed that the activity would have to be possible in terms of size, yardage, claim configuration and amount of land under claim, access, thoroughness of past exploration, and favorability of gold markets at the time of withdrawal. The mining claims where development is anticipated, shown in table 5, are grouped by drainage and ownership. Most of the claims listed have been active sometime during the last decade and could be expected to see some activity again in the future. Only one operation is anticipated to occur on each claim group. Unlisted claims are in areas where nothing of economic importance is known or are in areas that are thought to be mined out (see Claim Location maps in pocket).

Operational and resource data for the existing claims and for the recent operations, which would normally be used to estimate reserves or future mining activity, are nonexistent for some claim groups. Information concerning placer deposits in the area was collected mainly from USGS publications and from records kept by the company that operated the dredges on Woodchopper and Coal Creeks. Information, although limited, was also collected from previous plans of operations or from operators, and used whenever possible.

Recent mining activity on existing claims has been confined from small- to moderate-sized placer operations capable of processing up to 60 cubic yards per hour of gravel, none of which have operated regularly or at full capacity for a number of years. All of the operations used sluices only to process the gravels with the exception of the operation at Mineral Creek which also used a trommel. All of the operations fed their processing plants by dozers and/or front end loaders.

The size of operations is limited by low water levels during much of the summer season. None of the previous operations used settling ponds with water recycling systems to lessen their fresh water requirements. In addition, few of the operations screened the gravels to remove barren material before washing to reduce the amount of material processed and water used. Future operations will be required to treat discharge waters or will find it necessary to employ recycling systems and feed classification to meet water quality standards. Future operations have to divert some of the stream water into ponds to ensure an adequate water supply.

Because previous mining and recovery methods were not adequate to meet current environmental requirements, it was assumed that operations would use modern equipment and recovery techniques within the preserve during any future mining activity. Plants capable of processing up to 80 cubic yards per hour of gravel and using 900 to 1,500 gpm of water could be used on any of the claim groups. The trommel presently located on Mineral Creek falls within this range. The necessary equipment for future operations is listed in table 5.

Little information, is available concerning estimates of reserves if any, existing on the claims groups. Information is lacking concerning depth and extent of gravels on each claim group. Therefore, it is not possible to determine how long the mining of a particular claim group could operate before the reserves are depleted or how much of an area would be disturbed during the life of the mine. It is, therefore, assumed that there are enough reserves to keep all of the operations active for a ten year period. Based on a comparison of similar sized operations in Denali and Wrangell-St. Elias, it is estimated that 20 or 30 acres would be disturbed in each drainage during the ten year period.

One to four people would probably be necessary to run each operation. Adequate housing and support facilities exist to support mining on each of the claim groups, so additional structures should not be necessary.

The operating season in the area usually runs from mid-May to the first of October. Most of the equipment is left on the claims during the winter.

Several types of access can be used to get to claim areas. All of the claim groups are near airstrips, and many of the claim groups can be accessed by road or trail from the Yukon River. The Sam Creek road, however, has not been used in many years, and the road up Fourth of July Creek is only a winter trail. An established winter trail also exists from Circle Hot Springs to the claim groups in the Woodchopper and Coal Creek drainages and from Eagle down the Yukon River to Coal Creek. Historically, the Yukon River was the primary means of access to the claim areas, particularly where movement of large amounts of fuel and equipment were concerned, but most of the equipment for any future operations will probably be transported over winter trails. Two study areas within Yukon-Charley Rivers National Preserve were selected for detailed environmental evaluation. The area within the two units represents a mining influence zone. Within these two units, environmental changes caused by past mining were measured.

Table 5. Anticipated Mining Operations in Yukon-Charley Rivers National Preserve

Drainage	Equipment & Facilities	Expected Life (yrs)[a]	Total area of Disturbance acres
Fourth of July Creek	washplant 2 dozers 1 backhoe housing storage facilities generator fuel storage	10	20
Sam and Ben Creeks	same as above	10	20
Coal Creek (Boulder Creek)	same as above	10	20
Woodchopper Creek (Mineral Creek) (Iron Creek) (Patented claims)	same as above	10	30
4 placer operations			90 total acres of disturbance

[a] Reserves are unknown. It is assumed that each operation would have sufficient reserves to operate for a ten year period.

DELINEATION OF STUDY AREAS

Defining the probable extent and location of future mining activity, and identifying important resource topics were preliminary to the delineation of study areas. By establishing the limits of areas affected by mining, study areas focused procedures for assessing the cumulative impacts of mining on the target resources. Target resources are described in the following section.

Complete watersheds in which mining has occurred, or is expected to occur, were used as the building blocks of study areas. In Yukon-Charley, the mapping of claim groups presented in the mineral development scenario identified four major drainages affected by mining impacts. Three of these, the Woodchopper, Coal, and Sam Creek drainages, are contiguous. The combined areas of these watersheds represent one of the study areas selected for impact analyses. The Fourth of July Creek watershed, several drainages apart from the others, represents the other study area. All four of the watersheds are located south of the Yukon River and drain the dissected uplands. Placer mining has occurred in all four drainages.

WOODCHOPPER/COAL/SAM CREEK STUDY AREA

Woodchopper Creek and its tributaries drain 73.5 square miles or 47,025 acres. A total of 337 acres has been disturbed by past mining activities with the majority covered with mine waste and tailings along the stream. The unpatented claims in the Mineral and Iron Creek drainages and the patented mining claims are the only claims the Woodchopper Creek watershed with potential for future mineral development. It is assumed that all other Woodchopper Creek watershed claims have a little or no potential for future mining.

Coal Creek and its tributaries drain 83.7 square miles or 53,574 acres. A total of 769 acres has been disturbed by past mining activities, most of which are mine waste and tailings along the stream. All Coal Creek watershed claims are located within the Boulder Creek drainage and have potential for future mineral development.

Sam Creek and its tributaries drain 70.8 square miles or 45,344 acres. All past mining disturbance in the Sam Creek watershed is in the Ben Creek drainage. Ten acres have been disturbed by past mining activities, most of which consist of mine waste and tailings along Ben Creek. All Sam and Ben creek claims have future mineral development potential.

The three drainages cover a combined total area of 228.0 square miles or 145,943 acres. A total of 1,116 acres of past mining disturbance covers the study area (Mining Study Areas map [in text] and Woodchopper/Coal/Sam Creek Claim Location map [pocket]).

FOURTH OF JULY CREEK STUDY AREA

Fourth of July Creek and its tributaries drain 47.8 square miles or 30,598 acres. A total of 80 acres has been disturbed by past mining activities, most of which are mine waste and tailings along the stream. All Fourth of July Creek claims have potential for future mineral development.

The two study areas cover a combined area of 275.8 square miles or 176,541 acres (Mining Study Areas map). A total of 1,196 acres has been disturbed by past mining activities within the two study areas (Mining Study Areas map [in text] and Fourth of July Creek Claim Location map [pocket]). Mining has also occurred at other sites in the preserve, outside of the study areas (Mining Disturbance Outside Study Areas map). Mining at these sites has caused minor, insignificant modifications to the terrain, vegetation, and stream channels. Mining would not occur at these sites in the future.

TARGET RESOURCES

Target resources are natural, cultural, or socioeconomic resources identified as impact topics in this document. Target resources originated from major issues identified in the EIS scoping process. For a discussion of scoping relative to this statement see the Consultation and Coordination chapter. The target resources selected are wetlands, water quality, arctic grayling habitat, riparian wildlife habitat, peregrine falcon prey habitat, visual quality, cultural resources, subsistence use of resources, recreation and visitor use, wilderness suitability, local economy, and paleontological resources. Discussions of the park environment will focus on these resources.

VEGETATION AND WETLANDS

The vegetation of the Yukon-Charley region is part of the North American taiga, an extensive subarctic forest dominated by conifers and several species of deciduous hardwoods. Lowlands and drainages within the preserve are heavily forested. Uplands become more thinly forested with increasing elevation, and most areas above 3,000 feet are cloaked with treeless tundra vegetation. Forests are most commonly open and slow-growing, although dense vigorous stands of spruce occur on the most favorable sites. Large areas of open tundra are common where drainage is poor or other conditions inhibit the growth of trees.

The preserve is primarily trackless and primitive. Except for narrow, limited stretches along the Yukon and the lower reaches of its tributaries, the forest and tundra are in a natural condition. Because the region was untouched by glaciers, it contains one of the most diverse cross sections of interior types of vegetation in Alaska. Abrupt changes in plant communities reflect local variations in topography, soil, drainage, permafrost, and fire and disease--constituting an outstanding area for ecological research.

The preserve contains many different types of vegetation communities. A description, modified from Young (1976) of the major vegetation communities found in the preserve is in appendix 3. The categories used to classify the Yukon-Charley vegetation were based on Viereck, Dyrness, and Batten's (1986) system for Alaska vegetation classification. The major forest communities found in the preserve are coniferous forest, mixed spruce-broadleaf forest, and broadleaf deciduous forest. The major woodland communities include black spruce woodland, mixed spruce-broadleaf woodland, and broadleaf deciduous woodland. The primary scrub classes found within the preserve include tall scrub, short scrub, and arid scrub. Much of the preserve is covered with certain types of herbaceous vegetation including bogs and marshes (wet herbaceous) and alpine tundra and rockland (dry herbaceous).

In low-relief areas in the preserve where permafrost is common, the fine-grained soils and thick vegetation layers restrict groundwater circulation. A thick insulating layer of peat and a dense mat of ground vegetation develops in areas with limited drainage. Thick peat and shallow permafrost are self-perpetuating because they further restrict surface and subsurface drainage. The permafrost table is deeper near streams which flow through gentle-relief areas because of active water movement through the permeable streambed materials.

In areas with poor drainage and where the permafrost table is two to four feet deep, plant species with shallow root systems are dominant. Vegetation assemblages typical to shallow permafrost areas include stunted black spruce, short shrubs such as labrador tea, blueberry, and a thick moist ground layer of peat moss (*Sphagnum spp*), and caribou-moss lichen (*Cladonia spp*). White spruce, white birch, quaking aspen, alder, balsam poplar, and others with deeper root systems are common in well drained areas where the ground thaws to a depth of more than four feet in the summer. Stunted specimens of the usually deeper rooted trees and shrub, however, grow in shallow permafrost zones.

Roads, ditches, and heavy equipment trails in the two study areas have disrupted the insulating vegetation cover in shallow permafrost zones, and exposed underlying dark soil to the summer sun, causing frozen ground to thaw. So, the permafrost table has been lowered and drainage has been improved in these areas. This resulted in thermokarst topography and local subsidence of the surface. The plant community adjacent to this disturbance has shifted to include species with deep root systems.

Woodchopper Creek. Lower Woodchopper Creek is lined with spruce-hardwood forest. The broad, low benches on either side support extensive open stands of black spruce and dispersed patches of shrub tundra where drainage is poorest. Tributaries cutting across the benches are also lined with spruce. The valley slopes are forested with white spruce, birch, and aspen. The hardwoods dominate large areas on south-facing slopes and the creek flows through a thick stand of bottomland spruce-poplar forest at its mouth.

The midportion of Woodchopper Creek has been greatly disturbed by past mining. Most of the spruce along the main stem of the creek have been removed, and thick stands of young poplar and willow line the dredge spoils.

The upper valley is less disturbed, and the vegetation remains much as described for lower Woodchopper Creek.

A number of trails and roads follow the lower and middle valley on the north side. Trails also extend up several of the tributaries. Where these cross, steeper, well-drained ground trails are lined with alder and willow. Trails that cross flat tundra and black spruce stands leave a visible track or scar through the vegetation.

Coal Creek. The vegetation of Coal Creek is very much like that of Woodchopper Creek. The upper drainage is forested on the south slope, and the stream is lined with dense willow brush. As elsewhere, low slopes and the valley floor are vegetated with dwarf birch/shrub tundra. Most of lower and middle Coal Creek has been disturbed by past mining. Colorado Creek, Coal Creek's major tributary, is lined with white spruce-poplar forest; some past claims are located here. The benches support moderately open black spruce stands. On the south slope, aspen-birch groves alternate with spruce, although spruce dominates most of the north slope. An indistinct trail, leads up the lower and middle reaches to Discovery Creek. The trail may have been used only once, possibly during claim staking, as surface vegetation was not stripped.

Sam Creek. Sam Creek with its tributary Ben Creek, occupies narrower, steeper basins than the previous streams and is more heavily forested with upland spruce-hardwoods because drainage is better. Balsam poplar is mixed with white spruce near the creeks. Large patches of open black spruce stands are common, with some treeless tundra areas in the vicinity of the claims. Small spots along Ben Creek have been cleared for a camp and for mining; these areas support an open cover of grasses, willow, and hardwood saplings. The slopes and ridges above these creeks are well forested with aspen and white spruce.

Fourth of July Creek. The portion of this creek occupied by claims lies in a basin with a gently sloping floor vegetated with black spruce and tundra meadow. The bulk of the claimed area has been disturbed by mining at various times in the past and is dominated by aspen, poplar, and willow in various stages of maturity. Elevated benches were avoided during mining and still support considerable spruce. Various trails traverse the tundra and black spruce forest throughout the length of the claim area, and at least one unimproved trail leads to the Yukon.

Wetlands

Wetlands cover about 223 million acres, or 58 percent of Alaska. Wetlands cover a large area of Yukon-Charley Rivers National Preserve in lowlands along the Yukon River and the major tributary valleys. These areas provide a diverse combination of open water and vegetation important to migratory birds, waterfowl, moose, and other wildlife. Preserve wetlands have not been mapped.

The U.S. Environmental Protection Agency (EPA) and the U.S. Army Corps of Engineers (Corps) regulate activity in wetlands. In a definition based on the Clean Water Act (PL 92-500), these two agencies defined wetlands as:

> Those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas (33 CFR 328.3[f], 40 CFR 230.3[t]).

In general, wetlands perform a variety of valuable ecological functions including: (1) atmospheric, climatological, and meteorological stabilization, (2) groundwater discharge and recharge, (3) flood control, (4) erosion control, (5) water purification, (6) nutrient accumulation and cycling, (7) primary production, (8) secondary production, and (9) wildlife refuge (USFWS 1986; Feierabend and Zelazny 1987). Within the two study areas the most important ecological functions of wetlands are erosion control, water purification, nutrient accumulation and cycling, primary production, secondary production, and wildlife refuge.

Plant communities typically considered wetlands in the preserve fall into three categories: (1) permanent shallow standing water communities, (2) communities with seasonal or permanent high water tables, but without standing waters, and (3) communities adjacent to running water (riparian) (USFWS 1986).

There are limited permanent shallow standing water areas within the study areas. Small marsh areas occur along the lower and middle sections of Woodchopper, Coal, Sam, and Fourth of July creeks. Marsh plant communities are located in areas where very sharp meander bends were cutoff or streams changed course to form small oxbow lakes and abandoned meander channels. See appendix 3 for a description of typical marsh plant communities (category-1 wetland) in Yukon-Charley Rivers National Preserve.

In the Woodchopper, Coal, Sam, and Fourth of July creek valleys, wetlands communities with high water tables but without standing water are typically found where the lower and middle valleys have a gentle relief, shallow permafrost table, restricted drainage, and thick organic soil deposits. Typical category 2 communities include wet herbaceous (bogs, wet, and moist tundra), coniferous woodlands, and mixed woodlands (see appendix 3). Vegetation common to these areas includes stunted black spruce, stunted birch, short shrubs such as labrador tea, blueberry, and a thick ground layer of peat moss (*Sphagnum spp*), and caribou-moss lichen (*Cladonia spp*). Past surface disturbing activities, particularly in the Woodchopper and Coal Creek drainages, have eliminated or substantially changed these wetland communities in the mined areas.

The highly diverse riparian communities (category 3-wetland) adjacent to the study area streams are the most valuable vegetation communities to fish and wildlife in the two study areas. See the riparian wildlife habitat section for a detailed description of the riparian community in the two study areas.

AQUATIC RESOURCES

Water Quality

Waters within the Yukon-Charley Rivers National Preserve are in a natural condition, except tributaries draining the mined valleys. Yukon River tributaries within the preserve are free of glacial-melt water. In general, the natural chemical characteristics of water in most Yukon-Charley streams are suitable for fish and wildlife. A short growing season and frequently high sediment load limits the natural productivity of streams in the preserve.

The climate, geology, and vegetation of a drainage influence water quality. Water continuously cycles through the study area drainages. It begins as precipitation that is temporarily stored in streams, lakes, and groundwater in the rock and soil, and ultimately leaves through evaporation or drains into the Yukon River. The chemical composition of water reflects the chemical composition of the air, rock, soil, and vegetation it is exposed to during the hydrologic cycle. Chemical and physical characteristics of water change with any natural or human induced alternations in these four environmental features. Since water is the primary transport mechanism for an ecosystem's energy and chemical cycles, any change in the physical and chemical components of water due to human activity can alter an ecosystem's hydrologic chemical and energy cycle and cause wide-ranging ecological impacts.

The water quality of tributaries upstream from the past mining disturbances in the two study areas is in a natural condition. Water quality in these areas is similar to that of the majority of the streams in the preserve.

The following description of chemical and physical characteristics of natural stream water in the study areas and the changes in water quality related to past mining disturbance are based primarily on information from the 1986 National Park Service water quality survey, the National Uranium Resource Evaluation sample data (DOE 1981), and Young (1976). Parameters measured include dissolved oxygen, pH, alkalinity, hardness, total recoverable metals, dissolved metals, turbidity, settleable solids, suspended solids, and temperature.

The majority of the chemical components of the study area waters are within the EPA recommended water quality criteria for the protection of freshwater aquatic life (1986). Only zinc and pH levels are not within the EPA criteria at some sample sites.

The pH ranged between 6.6 and 7.7 at all sample sites (N=82) within the middle and lower reaches of the four study streams. The pH of some water samples collected in the upper reaches of Coal, Sam, and Fourth of July creeks ranged between 5.0 and 6.5. This pH range is below the EPA recommended water quality criteria for the protection of freshwater aquatic life (6.5 - 9.0). Low pH affects the toxicity of various substances in water. In addition, low pH levels may contribute to the release of an increased number of potentially toxic materials from stream sediments (EPA 1986).

Alkalinity, a measure of the buffering capacity of the water, ranged from 30 to 120 milligrams per liter (mg/l) as calcium carbonate ($CaCO_3$) except for the upper reaches of Fourth of July Creek.

Hardness was highly variable among the sites. Water hardness at the majority of the sample sites was classified as moderately hard (75 - 150 mg/l as $CaCO_3$) to hard (150 - 300 mg/l as $CaCO_3$). Hardness influences the toxic effects of certain metals on aquatic organisms. Hardness alone is not a limiting factor to aquatic organisms in the study area streams.

In 1986, metal composition of water samples from four sites upstream from the past mining disturbance and five sites downstream from the disturbance was determined (see Water Quality and Fisheries Sample Sites maps). Total recoverable and dissolved metal concentrations for 25 different metals, including arsenic and mercury, were within water quality standards or below detectable limits for all sample sites, except zinc. The total recoverable zinc concentrations ranged from 210 to 7,300 micrograms per liter (ug/l) and dissolved zinc ranged from less than 50 to 150 ug/l. For total recoverable zinc, the EPA criterion to protect freshwater aquatic life is 47 ug/l as a 24-hour average. In 1978, National Uranium Resource Evaluation water sample data were collected within the two study areas at 63 sites (DOE 1981) (Water Quality and Fisheries Sample Sites maps). Results were similar to the 1986 data except for the results of zinc levels. Strict quality control measures were used in both the collection of water samples in the field and analysis of samples in the laboratory; however, the possibility of zinc contamination of the 1986 water samples cannot be entirely ruled out.

The physical water quality components in the two study areas which limits the productivity of stream organisms include temperature, color, turbidity, and sediment. Past mining disturbances have affected the natural levels of these four components.

Water temperatures from mid-June to mid-August during 1978 and 1986 ranged from 36° to 66° F at 85 sample sites in the two study areas. The short growing season and low average summer temperatures limit stream productivity.

During June 1986, water in the four creeks studied was stained a dark brown from the high concentrations of humic compounds. The natural brown color of water results from leaching of organic soil. Depth of visibility was reduced to about 1 foot during this period. Darkness of the humic stain diminished through the summer. The color of water has no direct chemical significance. The chemical composition of humic compounds in water are similar to substances found in organic soil (USGS 1970). The effects of color in water on study area aquatic life are to reduce light penetration and thereby reduce photosynthesis by aquatic plants.

In Yukon-Charley Rivers National Preserve, there are distinct seasonal variations in stream sediment and turbidity levels. Low sediment and turbidity values occur under ice cover during the long, cold period after freeze-up and before break-up. Low values also occur during the summer except after rainstorms. High values accompany the major flows and erosion caused by snow- and ice-melt, and rainstorms. Stream discharge typically peaks during the spring-ice-breakup. During this period, average daily air temperatures

rise rapidly, corresponding with the increasing day lengths. Snow and ice rapidly thaw. Large hunks of ice flowing downstream have an abrasive effect on channel beds and banks. The high water and ice flow during this period result in extreme sediment concentrations and correspondingly high turbidity levels.

Streams within the two study areas naturally carry a high sediment load, primarily because of frequently high annual flows and highly erodible stream banks and channels. Because permafrost is present throughout most of the study areas, the ground absorbs little precipitation. As a result, runoff from summer storm events causes stream flows to dramatically increase within a 24-hour period. The higher flows cause increased stream channel and bank erosion, sediment transport, and turbidity. Undisturbed, watershed vegetation effectively protects soil from the erosional forces of precipitation and runoff; therefore, relatively little additional stream sediment results from erosion outside the stream corridor. The magnitude and duration of high turbidity and sediment levels associated with summer storm depends on storm intensity and duration, and sediment source. Typically, stream discharge, sediment, and turbidity return to prestorm levels within 48-hours.

Sediment levels and associated turbidity are highly variable for study areas streams. For water samples collected in 1986, settleable solids ranged between a trace and 3.0 milliliter per liter (ml/l). Total suspended solids ranged between 144 to 682 mg/l for the study area streams after storm events. Turbidity ranged between 0.5 and 5.0 Nephlometric Turbidity Units (NTU) during normal summer flows for the study area streams. After storm events, turbidity ranged from 5.0 to 120 NTU.

High stream sediment and turbidity levels have a negative effect on aquatic ecosystems in the two study areas. Sediment fills the gravel interspaces, reduces the sub-gravel flow that is vital to the survival of developing fish eggs, and hinders fry emergence from the gravel. Heavy sedimentation of stream bottom substrate also limits aquatic insect populations. The effects of periodically high sediment and turbidity levels on stream fauna include respiratory distress, reduced foraging efficiency, and avoidance. High turbidity levels reduces primary production by limiting sunlight to aquatic plants. Toxic metals, particularly arsenic and mercury, bind within and adhere to sediments. Therefore, high levels of metals can be correlated to increases in sediment. The effects of sediment on the stream ecosystem continue far downstream from the source of particulate material (Zemansky 1976; Bjerklie and LaPerriere 1985; EPA 1985; LaPerriere et al. 1985; ADF&G, 1985a, 1985b, 1986d; ADEC 1986; Alexander et al. 1986; and Lloyd et al. 1987).

Stream water is composed of runoff which enters the drainage system during and soon after precipitation periods and groundwater that infiltrates into the channel. Location of groundwater in the preserve is similar to, but more restricted than the pattern of groundwater distribution, in geologically analogous regions that are free of permafrost. Permafrost is extensive beneath the four drainages within the two study areas. Permafrost exists at a depth of six to eight feet under the streambed in the middle and lower reaches of Coal Creek. The average depth of the permafrost table decreases to about two feet in the poorly drained areas of the valley. Groundwater is found in unfrozen water-bearing soils and rocks. In the gently sloping areas of the mined valleys, groundwater usually occurs below or above the permafrost layer. Groundwater above the permafrost layer is limited to the upper two feet of the organic muck layer, except near streams. In the alluvial material adjacent to and below stream channels water exists to a depth of about 6 to 8 feet. Mining in the study areas has resulted in substantial thawing of frozen ground causing the volume of subsurface water to increase. Ground to surface water interchange and the flow of subsurface water are restricted by the low permeability of the study areas soil. However, water interchange and subsurface flow are higher in the permeable alluvial material near streambeds and disturbed areas stripped of the organic muck layer. The status of water-bearing, unfrozen zones below permafrost within the two study areas is uncertain.

Woodchopper Creek. Dissolved oxygen, pH, alkalinity, hardness, and metal levels (except zinc) of water sampled upstream, within, and downstream of previously mined areas along Woodchopper Creek were within EPA (1986) recommended limits for protection of aquatic life. Overall, water chemistry in Woodchopper Creek is not limiting to aquatic organisms and their productivity (table 6).

There is relatively little additional stream sediment from tailings along Woodchopper Creek. Coarse gravel and rubble cover the majority of the tailings, which stabilizes the tailings and makes them resistant to erosion. The channelized reach adjacent to the tailings is also relatively stable because of the high percent of rubble and boulder substrate along the banks and in the stream channel. The primary source of sediments is from previously disturbed areas adjacent to Iron and Mineral creeks. Here the stream channel and banks are very unstable and easily eroded. There were no obvious or measurable downstream changes in substrate composition or channel morphometry caused by the additional stream sediment from the previously mined area. However, the increased sediment input and associated turbidity from the disturbed areas along Woodchopper Creek and tributaries likely reduced the overall suitability of downstream habitat for aquatic organisms.

Table 6. Summary of Selected Water Quality Parameters for the Four Study Area Streams in Yukon-Charley Rivers National Preserve, Alaska

Stream Relationship to Past Disturbance	Wetted Stream Habitat Area[a] [acres(%)]	pH Range	Alkalinity Range (mg/l $CaCO_3$)	Hardness Class[b]	Sulfate Range (mg/l)	Specific Conductance (umhos/cm)	Metals Above EPA 1986 Criteria	Temperature (degrees F)	Low Flow Turbidity[c] (NTU)
Woodchopper									
Downstream	20.5 (29%)	7.0-7.6	72-121	Moderate	52-75	205-330	Zinc	46-55	1.1 - 1.5
Within	11.8 (17%)	7.0-7.7	50-111	Moderate	<50-54	180-290	--	41-55	1.3 - 1.5
Upstream	37.4 (54%)	6.5-7.6	60	Moderate	52	20-320	Zinc	36-52	1.5 - 2.0
Coal Creek									
Downstream	5.5 (6%)	7.0-7.7	101	Hard	85	240-410	Zinc	50-66	0.5 - 4.4
Within	33.9 (37%)	6.6-7.8	58-65	Moderate	70-110	30-400	--	47-50	2.0 - 3.0
Upstream	51.7 (57%)	6.1-7.3	58-60	Moderate	100-115	20-350	Zinc	40-52	3.0
Sam Creek									
Downstream	26.3 (40%)	7.0-7.5	45-71	Moderate	63-75	90-220	Zinc	43-48	3.0 - 5.0
Within	1.0 (1%)	7.1-7.5	68	Hard	175	115-340	--	47-60	4.5
Upstream	39.1 (59%)	6.0-7.2	29-35	Moderate	52-75	45-180	Zinc	44-46	2.0 - 5.0
Fourth of July									
Downstream	30.4 (59%)	7.0-7.5	40-103	Hard	90-125	80-440	Zinc	36-46	2.0 - 2.5
Within	4.3 (8%)	5.0-6.0	<1	Moderate	<50-125	15-200	--	42-48	1.9 - 2.0
Upstream	16.6 (33%)	5.4-7.0	3	Soft	<50	15-60	Zinc	39-47	1.3 - 2.5

Source: DOE 1981, NPS 1986

Note: Water quality data were collected between 6/24/78 and 7/12/78 and between 6/20/86 and 8/23/86

[a] Estimated summer fish habitat area for low water periods

[b] Soft ranges between 0 and 75 mg/l as $CaCO_3$, moderate ranges between 75 and 150 mg/l as $CaCO_3$, hard ranges between 150 and 300 mg/l as $CaCO_3$

[c] Turbidity measured during summer low water periods

Coal Creek. Dissolved oxygen, pH, alkalinity, hardness, and metal concentrations of the majority water sampled upstream, within, and downstream of previously mined areas along Coal Creek were within EPA (1986) recommended levels for protection of freshwater aquatic life (table 6). The pH of a few water samples from the headwaters of Coal Creek were below EPA recommended levels. Relatively high sulfate concentrations in Coal Creek may be limiting to sensitive aquatic invertebrates. The sources of sulfates in Coal Creek samples were probably from the small coal deposits located near the middle and upper reaches of Coal Creek.

Unlike Woodchopper Creek, there are substantial amounts of additional stream sediment from tailings along Coal Creek. Coarse gravel and rubble cover some of the tailings which makes them stable and resistant to erosion. In these areas the stream channel substrate adjacent to the tailings is also relatively stable. In contrast, those areas along Coal Creek recently disturbed by modern heavy equipment are extremely unstable. These areas are a major source of sediment in Coal Creek. Recently created tailings are composed of a high percentage of sand and fine gravel. Unstable tailings adjacent to the stream actively slough large volumes of material into the stream during high flows. Even during low flows, active sloughing of tailings is common. Rerouting and channelization of Coal Creek have resulted in the channel cutting into undisturbed vegetated areas. Steep organic soil banks commonly slough large clods of fine organic soil contributing additional sediments into Coal Creek. Where tailings and stream channels are the most unstable, lateral erosion has resulted in bankfull widths of more than 300 feet. Downstream of the tailings, the evidence of increased sediment input from nonpoint sources includes deposition of fine material, increased bank erosion, and decreased average depth. The additional sediment input from the previously mined area has substantially reduced the suitability of downstream habitat for aquatic organisms.

The highest water temperatures in the study area streams were measured in lower Coal Creek. The higher water temperatures were likely caused by increased solar exposure of the stream surface. Increased exposure was caused by increased stream width and loss of shading from streamside vegetation in the disturbed areas.

Sam and Ben Creeks. Dissolved Oxygen, pH, alkalinity, hardness, and metal concentrations in the majority of water samples taken upstream, within, and downstream of previously mined areas along Sam Creek were within EPA(1986) recommended criteria for protection of aquatic life. Overall, water chemistry in Sam Creek is suitable for aquatic organisms. However, in the upper reaches of Ben Creek near the previously mined area, high sulfate concentrations (175 mg/l) may be limiting to sensitive fish food organisms. The source of sulfates in Ben Creek is unknown (table 6).

The primary source of additional sediment from runoff is the previously disturbed areas near the upper reaches of Ben Creek. About 10 acres lack soil-stabilizing vegetation. There were no obvious or measurable downstream changes in substrate composition or channel morphometry attributed to the additional sediment from the disturbed area. In 1986, turbidity in Ben Creek increased to 120 NTU within the disturbed area during a single rainstorm. During the same storm, turbidity in Sam Creek below and above the confluence of Ben Creek appeared to be equally high.

Fourth of July Creek. Dissolved oxygen, pH, alkalinity, hardness and metal levels in water sampled downstream of previously mined areas along Fourth of July Creek were within EPA (1986) recommended limits for protection of aquatic life (table 6).

The pH within and upstream of disturbance ranged between 5.0 and 7.0. Most of the water samples were below the EPA recommended water quality pH criteria for the protection of freshwater aquatic life (6.5 - 9.0). The low pH near the Fourth of July claims was caused by exposure of water to rock and soil with high levels of pyrite ($FeSO_2$). The low pH of water samples were attributed to natural conditions. However, past mining exposed rock that was high in pyrite, as evidenced by the rust stained surface of the tailings. The 1986 samples showed a reduction in pH from 6.0 directly upstream of the Union Gulch confluence to 5.5 below the tailings. Alkalinity within and upstream of disturbance ranged from less than 1 to 3 mg/l as $CaCO_3$, corresponding to the low pH. Alkalinity concentrations are naturally low. The EPA recommended standard for alkalinity is 20 mg/l or more as $CaCO_3$, except where natural concentrations are less. Aquatic organisms in unbuffered waters are adversely affected by the pH extremes that often occur. Downstream about 1.2 miles from the tailings, the pH was 7.0 and alkalinity was 40 mg/l as $CaCO_3$. The low pH and low alkalinity of water in Fourth of July Creek within and upstream of the previously mined area reduce the suitability of habitat for aquatic organisms.

Total hardness of water samples collected within and upstream of the claims area ranged between 30 and 105 mg/l as $CaCO_3$. These values were almost equal to the noncarbonate portion of total hardness, which is typical for unbuffered low pH waters.

A major source of sediment in Fourth of July Creek is a large 50-foot high, eroding bank composed of alluvial material located near the Seventeen Gulch cônfluence upstream of the mine tailings. The primary source of additional sediment is from nonpoint runoff in the disturbance area. Approximately 80 acres of vegetative ground cover have been disturbed in the past. Directly downstream of the tailings, sediment from these two sources caused increased lateral erosion resulting in bankfull channel widths in excess of 100 feet, decreased average depth, and increased sediment deposition. Downstream approximately 1.2 miles from the tailings, there were no obvious or measurable changes in substrate composition or channel morphometry caused by the additional stream sediment from the previously mined area.

Table 6 presents a summary of selected water quality data for the two study areas. This table compares stream water quality information for water downstream, within, and upstream of past mining disturbance.

Fish Resources

Protecting healthy fish populations and habitat was among the reasons for establishing the Yukon-Charley Rivers National Preserve in 1980 (ANILCA [PL 96-487] Sec. 201[10]). The preserve's diverse aquatic habitat supports a fish population typical of the Eastern Alaskan interior. Eighteen species are known to inhabit the preserve and represent an important resource for subsistence, sport, and some commercial fishing.

Chinook (*Oncorhynchus tshawytscha*) and chum salmon (*O. keta*) are the most important species to local rural residents on the Yukon. Coho salmon (*O. kisutch*) are less common in the preserve. Sheefish (*Stenodus leucichthys*), humpback whitefish (*Coregonus pidscshian*), round whitefish (*Prosopium cylindraccum*), northern pike (*Esox lucius*), and burbot (*Lota lota*) are occasionally captured by local rural residents.

Arctic grayling (*Thymallus arcticus*) is the most abundant sport fish in the preserve. Northern pike are also highly prized and are found in the lower reaches of most tributaries and backwater sloughs along the Yukon River. In addition, sheefish, burbot, and Dolly Varden (*Salvelinus malma*) are occasionally taken by sport fisherman.

The following description of study area fish populations and habitat is based on a fishery survey completed in 1986 by the National Park Service. Population and habitat information was collected at 22 stream sample sites (see Water Quality and Fisheries Sample Sites maps). Fish communities were also sampled at five shoreline sites on the Yukon River near the mouth of the study area streams. Fishery surveys were not completed on most of the study area streams prior to 1986. Young (1976) sampled one site in the lower reaches of Sam Creek. Miners have also described angling for grayling on many of the streams within the two study areas.

Arctic grayling, round whitefish, and slimy sculpin (*Cottus cognatus*) are the most common fish species found in the streams of the study areas.

Arctic Grayling. Optimal grayling habitat is characterized by clear, cold water; silt free rocky substrate in riffle-run areas; well vegetated stream banks; abundant instream cover; deep pools; relatively stable flow regime and stream banks; and productive aquatic insect populations.

During the spring and summer, study area streams provide spawning, rearing, and feeding habitat for grayling. In the fall, grayling migrate to the Yukon River, where they overwinter when turbidity is low. Study area streams do not provide deep pools needed by grayling during the winter when shallow reaches can freeze to the bottom. Adult grayling migrate after spring ice breakup into the flooding, turbid tributaries to spawn. Juveniles move into the streams several weeks after adults. Preferred spawning substrate is likely to be riffle areas with small gravel substrate (ADF&G 1985; USFWS 1985). However, other authors have reported that grayling will spawn over a variety of substrates in both lakes and streams. Eggs are adhesive and adhere to particles stirred by the spawning pair. Particle weighted eggs settle into the interstices of the bottom gravel. Fry hatch in 16 to 21 days at 50° F, or longer at colder temperatures. Grayling fry remain in the gravel for only three to four days (ADF&G 1982). After emerging, fry drift downstream seeking quiet back-waters and protected areas along the streambank or interspaces between boulders and instream debris away from strong currents (USFWS 1985).

During the summer feeding period, grayling seek pools and cover that provide, food, shade, a secure place to rest, and refuge from stressful conditions such as swift currents. Undercut banks, debris in channels, pocket pools near large rocks, deep pools, brush piles, vegetation, and dead snags provide cover for fish. Grayling are territorial, and they partition stream habitat by fish-size class (i.e., the largest fish occupies the best habitat).

Grayling are present in Woodchopper, Coal, Sam, and Fourth of July creeks. Arctic grayling utilize an estimated 92 stream miles in the study areas for a total 257 acres of habitat. The 1986 fishery survey established the known grayling range in 55 miles of stream. A visual stream habitat assessment, conducted during low altitude reconnaissance, extended the range an estimated 37 stream miles. The known and probable grayling distribution in the study areas is mapped in the Arctic Grayling Habitat maps. Adult and juvenile fish ranged from 4 to 13 inches in total length for grayling captured at all the sample sites. In Woodchopper, Coal, and Sam creeks, numbers of grayling were relatively low (less than 25 adult fish per acre). In Fourth of July Creek, the grayling density was higher with roughly 35 to 50 adult fish per acre. Many grayling fry, 1 to 2 inches long, were collected near shore of the Yukon River directly downstream of the mouths of Woodchopper and Coal Creeks. These fry, which drifted downstream from the study area creeks, were in healthy condition. Shore samples were not completed near the mouths of Sam or Fourth of July creeks.

Undisturbed grayling habitat in the study areas streams is characterized by well vegetated stream banks, actively eroding banks, channel substrate composed primarily of gravel moderately embedded with sand, abundant cover, a moderate number of deep pools, poor macroinvertebrate production, periodically high turbidity and sediment load, and cold average-summer temperatures.

Chemical composition of water is not limiting to fish at the majority of sites, with the possible exception of low pH levels in upper Fourth of July Creek (table 7).

High turbidity and sediment load during major flows and low average seasonal temperatures are the natural physical factors that are most limiting to arctic grayling populations in the streams of the study areas.

Fish habitat is directly related to and is highly dependent on the vegetation of the surrounding watershed. Study area streambank vegetation was composed of a wide variety of riparian plant species, the composition of which was influenced by the depth of the permafrost table. In most reaches, the permafrost table is deep, allowing deep rooted species to grow along the banks. In the deep permafrost zone, common species include alder, willow, birch, and white spruce. Where the stream channel cuts into soil with a shallow permafrost table, black spruce woodland species are most common. Fallen shrubs, trees and limbs are the primary component of cover in the streams of the study areas.

Rooted vegetation and rocky ground cover stabilize stream banks by providing resistance to the erosional forces of flowing water. In general, the majority of study area streambanks were unstable. Large sloughing banks of organic soil were common where stream channels had eroded into muskeg. Large clods of peat soil were frequently found in the wet stream channel below these organic soil banks. Even during low flow, a turbid plume would extend downstream from the eroding clods. Bank erosion was highest in muskeg areas where shallow permafrost tables resulted in a lack of soil binding roots. To a lesser degree, active bank erosion also occurred along reaches where deep rooted vegetation dominated. Flowing water undercut supporting bank soil along these reaches resulting in trees leaning or falling into the stream channel. The unstable banks are a major source of sediment and turbidity in the streams.

Stream channel substrate composition varied between sample sites, depending on stream velocity, gradient, and sediment source. A common feature to all sites was a relatively high proportion of fine material embedding the larger rock substrate. At the majority of the sample sites, channel substrate was primarily a mix of gravel, sand, and cobble (table 7). Bottom substrate was loosely packed at most sites. In general, bedload was very high during storm flows. As a result, the bottom substrate was scoured clean of the periphyton community, an important aquatic food base.

At the undisturbed sites, 5 percent to 38 percent of the sample reaches provided pool habitat. Maximum pool depth ranged between 1.5 and 5 feet. Fifteen to 76 percent of the pool habitat had instream cover in the form of brush, logs, debris piles, undercut banks, and overhanging vegetation (table 7). Brush, logs, and debris were the primary cover components. Greater numbers of grayling were found in pools with instream cover.

Aquatic invertebrate populations at the 22 sample sites included the larval insect stages of mayflies, stoneflies, black flies, midges, crane flies, flat worms, water mites, aquatic earthworms, and copepods. Other invertebrates present at some, but not all, sample sites included scuds, round worms, larval stages of aquatic dance flies, moth flies, biting midges, mountain midges, net-winged midges, dixid midges, and water beetles. Midges, mayflies, and stoneflies were the most common invertebrates in the samples. Caddisfly larvae were scarce or absent at all the sample sites. Water mites, which are very sensitive to changes in water quality

Table 7. Summary of Selected Fish Habitat Parameters for the Four Study Areas Streams in Yukon-Charley Rivers National Preserve, Alaska.

Stream		Stream Water Quality					Stream Morphometry						Stream Sediment		
Relation to Past Disturbance	Wetted Habitat Area[a] [acres(%)]	pH Range	Low Flow Turbidity[b] (NTU)	# of Metals Above 1986 EPA Criteria	Status of Hazardous Material[c]	Aquatic Insect Biomass[d] (g/m^2)	Average Stream Sinuosity	Average Stream Gradient (%)	Pools (%)	Pool Area w/ Instream Cover (%)	Relative Streambank Vegetated (%)	Habitat Access Obstructed[e]	Fines (%)	Eroding Banks (%)	Disturbance in 400' Buffer (acres)
Woodchopper															
Upstream	37.4 (54)	6.5-7.6	1.5-2.0	1	None	0.2-0.4	1.4	1.4	5-35	20-25	71-82	No	6-15	34	0
Within	11.8 (17)	7.0-7.7	1.3-1.5	--	Present	0.2-0.3	1.2	1.2	1-12	0-70	75-78	No	14-19	32	103
Downstream	20.5 (29)	7.0-7.6	1.1-1.5	1	Upstream	0.3-0.4	1.8	0.5	12-38	17-33	75-89	No	12-38	28	0
Coal Creek															
Upstream	51.7 (57)	6.1-7.3	3.0	1	None	0.1-0.3	1.4	0.9	23-35	30-76	81-86	No	14-25	23	0
Within	33.9 (37)	6.6-7.8	2.0-3.0	--	Present	0.2-0.3	1.1	1.0	1-3	0-38	27-44	No	11-20	80	265
Downstream	5.5 (6)	7.0-7.7	0.5-1.5	1	Upstream	0.8	1.6	0.8	19	11	82	No	33	80	18
Sam Creek															
Upstream	39.1 (59)	6.0-7.2	2.0-5.0	1	None	0.3-0.4	1.3	1.4	25-33	15-36	87-95	No	13-23	30	0
Within	1.0 (1)	7.1-7.5	4.5	--	Present	0.2-0.3	1.0	1.8	1	10	76	Yes	35	53	2
Downstream	26.3 (40)	7.0-7.5	3.0-5.0	1	Upstream	0.2-0.4	1.5	0.6	16-30	15-32	79-95	No	35-39	23	0
Fourth of July															
Upstream	16.6 (33)	7.0-7.5	1.3-2.5	1	None	0.5-0.8	1.2	2.0	15	20-72	98-99	No	26-35	25	0
Within	4.3 (8)	5.0-6.0	1.9-2.0	--	Present	0.1-1.4	1.1	1.7	4-11	4-5	67-96	No	16-26	55	57
Downstream	30.4 (59)	5.4-7.0	2.0-2.5	1	Upstream	0.3-1.9	1.4	1.0	14-15	5-21	98-99	No	26-26	20	0

Sources: DOE 1981; NPS 1986 Water Quality and Fisheries Survey; NPS 1988 Yukon-Charley Rivers National Preserve GIS database.

Note: Water quality and fisheries data were collected between 6/24/78 and 7/12/78 and between 6/20/86 and 8/23/86.

[a] Estimated summer fish habitat area for low water periods.

[b] Turbidity measured during summer low water periods.

[c] Presence, absence, or relative location of fuel and oil containers, chemical containers, contaminated soil, and/or heavy equipment.

[d] Average dry weight biomass of macroinvertebrates in riffle areas.

[e] Presence of absence of natural or manmade impassable stream barriers.

caused by active mining (Wagner and La Perriere 1985), were present at all sites. In general, the number of organisms was relatively high at most sites, but most organisms were very small in size. Dry weight standing crop in riffle areas was low, averaging between 0.1 and 0.8 grams per square meter (g/m^2) at all sites, except for two Fourth of July Creek sites. Here, the invertebrate standing crop averaged between 1.4 to 1.9 g/m^2 (table 7).

For all streams, stomach analyses of grayling showed that they fed primarily on drift composed of both aquatic and terrestrial insects. There was a relatively high percentage of organic debris in the stomachs. Round whitefish fed primarily on benthic organisms, especially black fly larvae.

The following site-specific arctic grayling population and habitat description is based on the 1986 NPS fishery survey. Stream lengths and areas were computed from both field data and a geographic information system database for Yukon-Charley Rivers National Preserve (appendix 2).

Woodchopper Creek - Grayling in Woodchopper Creek occupy an estimated 21 stream miles or 70 acres of stream habitat. In 1986, grayling were captured at sample sites from the Yukon River 12.4 miles upstream to Caribou Creek. Grayling densities were relatively low at less than 25 adults per acre. All fish captured were in a healthy condition. Grayling fry were captured in lower Woodchopper Creek near the confluence of Dome Creek.

Lower Woodchopper Creek provides suitable habitat for all grayling life stages. Stream habitat is in a natural condition and shows no obvious evidence of modification from past placer mining operations. This reach has high sinuosity and low gradient. The gentle slopes of the surrounding terrain are well vegetated. Deep pools and instream cover are abundant. Log debris jams are common and provide the majority of instream cover. Undercut banks, overhanging and fallen vegetation provide additional cover. The streambanks are densely vegetated with a wide variety of riparian species. Eroding banks are common. Bottom substrate is primarily gravel and rubble embedded with sand. Channel substrate is unstable and scoured as evidenced by the lack of attached organisms. Aquatic insect production in riffle areas is poor.

Past placer mining operations along the middle reaches of Woodchopper Creek have caused major modifications of the original stream channel and have substantially altered the original habitat characteristics. As a result of these alterations, this reach provides relatively little resting, feeding, spawning, or rearing habitat for grayling. Past mining has channelized or rerouted 2.9 miles of stream habitat. Compared to unmined reaches, sinuosity of the mined reach was changed from an estimated 1.6 to 1.2. The premining reach length was an estimated 30 percent longer than what exists today. Reach gradient was changed from 0.8 percent to 1.2 percent, resulting in a higher average stream velocity. The surrounding terrain is primarily barren tailing mounds covered with rubble and coarse gravel. Channel substrate is composed primarily of rubble embedded with sand and fine gravel. Streambank substrate is stable and composed mainly of exposed rubble and coarse gravel. Pool habitat is sparse and shallow where it occurs. Instream cover is mostly small debris. Alder is the dominant streambank plant species, while grasses, forbs, and short shrubs are sparse. Aquatic invertebrate production in riffle areas is very low. Additional sediment from runoff of disturbance adjacent to Mineral and Iron Creeks further reduces the quality of downstream habitat in Woodchopper Creek. Mineral and Iron creeks do not provide suitable habitat to support any arctic grayling life stages.

Woodchopper Creek habitat and surrounding terrain above the previously disturbed area is very similar to habitat downstream of the mined area. The primary difference is a higher percentage of rubble in the channel substrate.

Upstream habitat characteristics gradually change as gradient increases. Woodchopper Creek, near the confluence of Caribou Creek, has a steeper gradient and lower sinuosity. The adjacent terrain varies from a gentle relief to steep rock outcroppings. These outcroppings are a source of coarse particulate material into the stream. Large rubble and boulders embedded with sand and fine gravel dominate the channel and bank substrate. Here the stream channel and banks are relatively stable. The abundant boulders create shallow pool and cover habitat. Deep pool habitat is scarce and instream debris cover is generally lacking. Streambanks are well-vegetated with wide variety of riparian species. Table 7 presents a summary of selected stream habitat data. Very few grayling were captured in this reach. However, adult grayling were common in the lower reaches of the smaller Caribou Creek.

Coal Creek - Coal Creek provides approximately 25 stream miles of grayling habitat. Total stream habitat area is about 80 acres. Grayling were collected at Coal Creek sample sites from the Yukon River 13.5 miles upstream. Adult and juvenile grayling densities were low at all Coal Creek sample sites. Numerous grayling juveniles and fry were observed or captured in Coal Creek tailing ponds. These ponds had outlets which drained to Coal Creek. Many fry and juveniles were also captured or seen in a small Coal Creek tailings channel fed by groundwater and small Coal Creek tributaries. Additional grayling fry were collected in backwater areas in lower Coal Creek.

Habitat characteristics in lower Coal Creek have been drastically altered by the additional stream sediment from the previously mined area. As a result, the quality of grayling resting, feeding, rearing, and spawning habitat has been substantially reduced. This stream reach has a higher sinuosity, lower gradient, slower stream velocities, and lower sediment transport capacity than the upstream stretch that flows through the mined area. Sediment from upstream has deposited on the channel bottom filling pools and reducing average depth. The reduced depth has caused increased bank erosion resulting in a wider stream channel. Channel substrate is an unstable mixture of sand gravel and rubble. Backwater and pool substrate is often covered with a layer of fine sediment. Instream cover is scarce. Aquatic insect production in the riffle areas is very low. The adjacent terrain is generally well-vegetated and has a gentle relief.

Past placer mining operations along the middle reaches of Coal Creek have caused major modifications of the original stream channel and have substantially altered the original habitat characteristics. As a result of these alterations, this reach provides relatively little resting, feeding, spawning, or rearing habitat for grayling. Past mining has channelized or rerouted 7.6 miles of stream habitat. Compared to unmined reaches, sinuosity of the mined reach was changed from an estimated 1.6 to 1.1. The mined reach length was an estimated 30 percent longer than what exists today. Gradient was changed from 0.8 percent to 1.0 percent, resulting in higher average stream velocity. Within the mined reach, an estimated 705 acres of riparian vegetation has been disturbed. In general, the stream channel is wide and poorly defined. During peak flows the stream width may vary from 50 feet to greater than 300 feet. The surrounding terrain is primarily barren tailing mounds covered with rubble, coarse and fine gravel, and sand. Channel substrate is a loose mixture of rubble, gravel, sand. Pool habitat is sparse and shallow. Instream cover consists of mostly small debris. Streambank vegetation is generally lacking. Where vegetation is present, alder or willow is the dominant streambank plant species, while grasses, forbs, and short shrubs are sparse. The majority of the streambanks are an unstable mix of loose sand, gravel, rubble, or exposed organic soil. However, some banks are stable where the bank material is mainly rubble and coarse gravel. Aquatic invertebrate production in riffle areas is very low.

Upstream habitat is in a pristine condition. The stream meanders through a well-vegetated gently sloping valley. The stream banks are densely vegetated with a variety of riparian plant species. Deep pools and instream cover are moderately abundant. Log and brush debris jams are common and provide the majority of cover. Undercut banks, overhanging and fallen vegetation provides additional cover. The dominant bottom substrate is coarse gravel and small rubble embedded with sand and fine gravel. Macroinvertebrate production in the riffle areas is poor and the majority of the stream banks are eroding. Large clods of organic soil commonly slough in to the stream. Further up the valley, the adjacent terrain varies from a gentle relief to steep rock outcroppings. These outcroppings are a source of coarse particulate material into the stream. Table 7 presents a summary of selected stream habitat data.

Boulder Creek is a small tributary of middle Coal Creek. Boulder Creek habitat is characterized by well-vegetated and stable banks, coarse gravel and small cobble substrate, lack of pools and cover, and swift flows. This habitat has little value for supporting any grayling life stages.

Sam and Ben Creeks - Sam Creek and its tributaries support grayling in an estimated 26 miles of stream. Estimated stream habitat area is 65 acres. The 1986 survey established the known range from the Yukon River 16.7 stream miles up Sam Creek. During the survey, fish were not captured in Ben Creek, a tributary of Sam Creek. However, miners have described the taking of grayling with hook and line in Sam Creek tributaries, including Ben, Big Smokey, and Sawyer creeks.

Sam Creek meanders through a well-vegetated gently sloping valley. Stream habitat is in a natural condition and shows no evidence of modification from past placer mining operations. The stream banks are densely vegetated with a variety of riparian plant species. Deep pools and instream cover are moderately abundant. Log and brush debris jams are common and provide the majority of instream cover.

Undercut banks, overhanging and fallen vegetation provides additional cover. Stream substrate is composed primarily of gravel and sand with rubble being less abundant. The percentage of sand and fine gravel in Sam Creek is much higher than that found in Coal, Woodchopper, or Fourth of July creeks. Aquatic insect production in the riffle areas is poor and the majority of the stream banks are unstable. Sloughing organic soil banks are common. Steep rock outcroppings adjacent to Sam Creek are found in both the lower and upper reaches and are a major source of particulate material in the stream. Table 7 presents a summary of selected stream habitat data.

Lower Ben Creek habitat is characterized by well-vegetated banks, abundant shallow pools and instream cover, a substrate composed primarily of gravel embedded with sand, and poor invertebrate production. Past placer mining operations along upper Ben Creek have modified the original stream channel and changed the original habitat characteristics. This reach lacks pools and instream cover, has unstable banks, and has poor invertebrate production. Streamside vegetation has been substantially reduced. Upper Ben Creek habitat has no fishery value, and during many summers goes completely dry.

Fourth of July Creek - Grayling are distributed in approximately 42 acres of habitat in 20 miles of stream in the Fourth of July Creek drainage. Known distribution is from the Yukon River upstream 12.5 miles to Seventeen Gulch. Grayling were relatively abundant at all sample sites, including sites within the mined area. All captured fish were in a healthy condition.

Stream habitat in middle and lower Fourth of July Creek is in a natural condition and shows no obvious evidence of modification from past placer mining operations which occurred in the upper valley. The lower reaches of Fourth of July Creek meander through the wide Yukon River terrace. The surrounding terrain is flat and well-vegetated. The dense streamside vegetation is dominated by alder. Further upstream the valley relief varies from a gentle to a moderate slope. Correspondingly, stream gradient increases. Here the streamside vegetation is a dense mix of riparian plant species. Less than 15 percent of stream area provides pool habitat. Log and brush debris provide the majority of cover in the pools. Overhanging and fallen vegetation provides additional cover. Stream substrate is primarily gravel and small rubble embedded with a high percentage of fine material. Stream banks are relatively stable. Aquatic insect production in the riffle areas is good in comparison to the other three study streams. The greater number and the higher average condition factor of grayling in Fourth of July Creek reflects the more productive aquatic invertebrate population.

Past placer mining operations along upper Fourth of July Creek have caused major modifications of the original stream channel and have substantially altered the original habitat characteristics. These alterations have reduced the quality of grayling habitat. Here the creek flows through a poorly defined and straight channel. Bankfull channel widths vary from 10 to 100 feet. Pool habitat is sparse and shallow and instream cover is mostly small debris. Bottom substrate is a loose mix of gravel, sand, and rubble. Stream banks are actively eroding. Adjacent vegetation is primarily willow, grasses and forbs. Most of the original surrounding topography has been modified. The pH of most water samples ranged between 5.5 and 6.0 and were below the 1986 EPA recommended criteria for the protection of freshwater aquatic life. However, adult grayling captured at these sites were in good condition and densities were relatively high. In Alaska, grayling are often found in bog-fed streams and tolerate the lower pH water.

The upstream of the disturbed area habitat is in a pristine condition. The stream channel is narrow and deeply entrenched. Streambanks are stable and typically covered with wet tundra mixed with willow, alder and birch. Shallow pools cover less than 15 percent of the stream area. Stream cover from overhanging vegetation is abundant, and the bottom substrate is a loose mix of sand, gravel and cobble. Aquatic invertebrate productivity is relatively high (table 7).

Salmon. There is no documented occurrence of salmon spawning in tributaries draining the Woodchopper/Coal/Sam creek study area. However, in 1986, two juvenile chinook salmon were collected in a 650 foot reach of lower Sam Creek. These juveniles likely moved upstream from the Yukon River. Habitat in the lower reaches of the study area streams has little value to rearing salmon because of the low biomass of aquatic invertebrates and flow extremes. Five juvenile chinook salmon 2 to 3.3 inches long were captured during Yukon River shore sampling below the mouth of Woodchopper Creek. One juvenile was captured below the mouth of Coal Creek.

The lower 5.5 miles of Fourth of July Creek has been cataloged by Alaska Department of Fish and Game (1985) as a known chum salmon spawning habitat. In this reach, the quality of the spawning substrate is poor because of the high percentage of fines and the unstable nature of the stream channel and banks. In recent years, very few adult salmon have been observed in Fourth of July Creek during spawning runs (Ulvi, pers. comm. 1988).

Other Species. Other fish species collected in the study areas include round whitefish, slimy sculpin, and burbot and longnose sucker (*Catostomus catostomus*). Burbot and longnose suckers were captured in the lower reach of Sam Creek during the 1986 NPS survey. Numbers were relatively low. A single burbot was captured in the lower section of Fourth of July Creek. Round whitefish and slimy sculpin were common in the middle and lower stream reaches of the Woodchopper/Coal/Sam Creek study area.

The round whitefish is common throughout the interior of Alaska. This fish can be recognized by its long cylindrical body and narrow pointed snout. In Alaska, it is not considered an important sport or commercial species, although there is some subsistence use. Round whitefish are found throughout the preserve in most tributaries of the Yukon River. Round whitefish spawn in late September through October in the interior of Alaska. In streams, spawning occurs in shallow gravel bottom reaches.

Round whitefish are present in the middle and lower reaches of Woodchopper, Coal, and Sam creeks. None were captured during the 1986 NPS fishery survey in Fourth of July and Ben creeks. Round whitefish were found in Woodchopper Creek from the Yukon River upstream 7.4 miles to the confluence of Iron Creek. The Coal Creek population ranges from the Yukon River upstream 8.0 miles to Colorado Creek. The Sam Creek population ranges between the Yukon River 8.0 miles upstream to the upper claim on Sam Creek. Numerous fry, one to two inches long, were collected in the Yukon River just below the mouth of Woodchopper and Coal creeks. The large number of larval fish below each stream is evidence of round whitefish spawning in Coal and Woodchopper creeks. Fry were also captured in the lower reach of Sam Creek. Total fish length ranged between 5.5 to 11.5 inches for adult and juvenile whitefish collected in the study area. Numbers of round whitefish were relatively low in the three study area streams.

Slimy sculpin are small bottom-dwelling fish commonly found in Alaska waters. Sculpins may be recognized by the broad, flattened head tapering abruptly into the rather slender scaleless body. Slimy sculpin spawn in the spring shortly after ice-breakup.

Slimy sculpin are present in the middle and lower sections of Woodchopper, Coal, and Sam creeks. During the 1986 NPS fishery survey, no slimy sculpin were captured in Fourth of July Creek or in Ben Creek. The Woodchopper Creek sculpin population ranges between the Yukon River 7.4 miles upstream to the confluence of Iron Creek. In Coal Creek, slimy sculpin were captured in 6.8 miles of stream from the Yukon River upstream. Sculpin in Sam Creek range between the Yukon River 8.0 miles upstream to the upper claim on Sam Creek. Length of slimy sculpins captured in the study area during the 1986 survey ranged between 1.5 and 4.5 inches. As with round whitefish and arctic grayling, numbers of sculpin were relatively low in the sampled streams within the study area.

Ten fish species were captured with a small-meshed seine close to shore of the Yukon River near the mouths of Woodchopper and Coal creeks. A total of 476 fish were captured with 90 percent being less than age one. Species collected in order of relative numbers were arctic grayling, round whitefish, longnose sucker, lake chub (*Couesius plumbeus*), chinook salmon juveniles, slimy sculpin, trout perch (*Percopsis omiscomaycus*), arctic lamprey larvae (*Lampetra japonica*), northern pike, and burbot. Density and diversity of fish species near the mouth of the these two streams were higher than at other Yukon River shore sample sites away from the mouths of any clear water stream. Clear water tributaries provide a food source for Yukon River fish and turbidity-free water for sight-feeding fish.

WILDLIFE RESOURCES

Protecting healthy wildlife populations and habitat was among the reasons for establishing the Yukon-Charley Rivers National Preserve in 1980 (ANILCA [PL 96-487] sec. 201[10]). The preserve provides habitat for a rich diversity of wildlife, including at least 34 species of mammals, 158 species of birds and one species of amphibian (NPS 1982).

Riparian Wildlife Habitat

Riparian ecosystems are associated with water and occur as transition zones or ecotones between aquatic and terrestrial (upland) ecosystems. These transition zones have distinct vegetation and soil characteristics. With the exception of some upland roads and one upland airstrip, all of the claim groups and areas of past mining disturbance in the two study areas occur in or directly adjacent to riparian ecosystems. Therefore, because of its unique importance to wildlife, riparian wildlife habitat was selected as a single, all-encompassing target resource for quantitative assessments of mining impacts on wildlife resources in this analysis.

Riparian ecosystems are uniquely characterized by the combination of high species diversity, high species densities, and high productivity. Continuous interactions occur between riparian, aquatic and adjacent terrestrial ecosystems through exchanges of energy, nutrients, and species. All four of the basic habitat components for wildlife (water, food, cover, and space) are found in riparian ecosystems. In addition, riparian areas are richer in microhabitat diversity and consequently wildlife diversity, and numbers of individuals are higher than in adjoining upland plant communities.

Because of the continuous interaction between riparian and adjacent ecosystems, the influence of riparian areas is not limited to those animal species which are restricted in distribution to the streamside vegetation. Wildlife productivity in adjacent habitats is also affected by riparian habitat condition and by man's activities in the riparian zone. The zone provides a travel corridor for many terrestrial mammals and has beneficial effects on adjacent avian populations by providing nesting, roosting, feeding and watering areas. Thus, the significance to game and nongame wildlife, both within and in the vicinity of the riparian ecotone, surpasses the importance of any other habitat type.

The great importance of riparian habitat in terms of its productivity, its relationship to other terrestrial communities, and its high proportion of use by game and nongame wildlife species makes the selection of it as a representative target resource for wildlife a logical and biologically meaningful approach.

In the Yukon-Charley Rivers National Preserve, riparian ecosystems are found along the Yukon River, its major tributaries, the Nation, Kandilk, and Charley Rivers, and along all smaller tributaries and stream courses. The largest, most significant riparian areas occur in low-lying, low gradient valleys typical of the larger Yukon tributaries and the lower reaches of smaller tributaries, including the valleys where most of the claim groups and areas disturbed by past mining are located. All of the mining claims in the preserve lie in or directly adjacent to riparian ecosystems.

Important wildlife species that utilize riparian wildlife habitat include black bear, moose, and small mammals and birds, and the species that prey upon them, such as wolves. Other notable species present in the preserve include Dall sheep, caribou, red fox, lynx, grizzly bear, snowshoe hare, beaver, bald and golden eagles, several species of waterfowl, and the northern wood frog, the only amphibian found in the interior of Alaska.

Dall sheep and the Fannin color phase of Dall sheep occur on river bluffs at high elevations, but they do not occur in the study areas. Caribou and grizzly bear have been known to occasionally use habitat on or near the claim areas, but these areas do not represent primary habitat for either species. Peregrine falcons are numerous in the preserve and are discussed under the threatened and endangered species section.

Riparian wildlife habitat is similar in all of the drainages in both study areas. All of the study area streams drain into the Yukon River from the south, have similar gradients, and cover similar altitudinal ranges. Consequently, vegetation characteristics, although variable, differ only slightly.

The lowest-lying riparian areas are generally best developed and may contain forested areas of white spruce in open or closed stands, Balsam poplar, and extensive areas of black spruce/muskeg. Understories of closed canopy forests are slight, dominated by primarily forest floor mosses and herbs. Open canopy understories are more substantial, often consisting of *Alnus incana, Vibumum edule, Rosa acicularis, and Ribes spp.* Black spruce/muskeg areas are often separated from the streambanks by narrow fringes of white spruce and have understories of dwarf scrub, primarily *Vaccinium spp.* and *Salix pulchra*. Mixtures of black spruce, white birch, and several tall willow species and alder occur on the lower reaches of the streams. Upper reaches of streams and those at higher altitudes are commonly surrounded by riparian willow thickets consisting of dense *Salix spp.*, sometimes mixed with variable amounts of *Alnus incana* (Young 1976).

Riparian habitat mapping and measurements from aerial photographs indicate that premining riparian wildlife habitat totalled approximately 1,227 acres in the Woodchopper Creek basin, 2,081 acres in the Coal Creek basin, and 1,158 acres in the Sam/Ben Creek basin for a study area total of 4,466 acres (table 8). Past mining activities have disturbed 1,116 acres of riparian corridor vegetation (riparian habitat and some adjacent upland vegetation) in the three drainages combined, 841 acres of which were estimated to be riparian wildlife habitat. Thus, past mining activities have disturbed 18.8 percent of the total premining riparian wildlife habitat in the study area (table 8, Woodchopper/Coal/Sam Creek Riparian Wildlife Habitat map).

Fourth of July Creek was estimated to contain 833 acres of riparian wildlife habitat before mining disturbance. Past mining disturbed 80 acres of riparian corridor vegetation, 56 acres of which was riparian wildlife habitat. Thus, past mining activities have disturbed 6.7 percent of the premining riparian wildlife habitat in this study area (table 8, Fourth of July Creek Riparian Wildlife Habitat map).

Table 8. Study Area Acreages for Premining, Existing, and Past-disturbed Riparian Wildlife Habitat in the Yukon-Charley Rivers National Preserve, Alaska

Drainage Study Area	Riparian Wildlife Habitat				Total Riparian Corridor Dist.*
	Premining	Current	Lost	%Lost	
Woodchopper	1,127	1,101	126	10.3	337
Coal	2,081	1,376	705	33.9	769
Sam/Ben	1,158	1,148	10	0.86	10
Study Area Total	4,466	3,625	841	18.8	1,116
Fourth of July	833	777	56	6.7	80

* Includes riparian and some adjacent upland vegetation

Prominent Riparian Ecosystem Species

Black Bears. Black bears range throughout the preserve and inhabit predominately lowland forests and brushlands of which riparian habitats are an important component. Preserving habitat for and healthy population of black bears was mandated by ANILCA (PL 96-487)(sec. 201[10]).

Black bear population estimates are not available for the preserve, and little is known about black bear population characteristics in the interior of Alaska. However, black bear populations are reported to be at moderate levels in the preserve, and are believed to have increased in recent years (NPS 1985).

Generally, black bears prefer upland forest and floodplain forest communities below 2,000 feet in elevation (ADF&G 1978a). Emerging from their dens in spring, black bears seek the new plant growth on southern exposures and continue to subsist primarily on vegetation throughout the summer. However, black bears are opportunistic feeders and will readily take other foods that they encounter, such as carrion and spawning salmon. Berries become an important part of their diet in late summer and early autumn.

Population estimates for black bear in the study areas are not available, although their common occurrence in the drainages is generally well known. Black bears can be expected to use riparian habitat in the study areas below 2,000 feet.

Moose. Riparian ecosystems are an integral part of moose habitat in the Yukon-Charley Rivers National Preserve. Preserving the critical range necessary to support a healthy moose population was a part of the justification for establishing the preserve in ANILCA (PL 96-487)(sec. 201[10]). Moose, in addition to being an important prey species for wolves and bears, are an important species for subsistence hunters in the area.

Moose can generally be found throughout the preserve in all areas below 4,000 feet elevation. Based on an aerial stratification survey of 3,556 square miles (including much of the preserve) in November 1987, the total moose population for the immediate Yukon-Charley area was roughly estimated at 1,100 animals (ADF&G 1988). Moose densities were estimated at one moose per 0.9 to 10.0 square miles.

Moose habitat requirements vary with the season (ADF&G 1986). In winter they prefer the cover of alpine shrub or riparian shrub communities, and willow (*Salix spp*.) browse. Dense, pure stands of *S. Alaxensis* and *S. planifolia* are preferred, which are predominately found in the tall shrub and floodplain forest communities in riparian corridors. Other willows, birch, and lichen are used to a lesser extent. Willows remain an important food source through the spring, but animals also seek aquatic vegetation, sedges, and mineral licks (Tankersley 1981). Calving areas are typically thick lowland stands of trees and shrubs. Moose generally move to open upland shrub thickets in the summer. Use of these areas peaks during the fall rut. Compared to other wildlife species, moose are relatively adaptable to habitat perturbations, and seral plant communities that develop after fires, floods, or other disturbance provide important forage.

Population estimates for moose in the study areas are not available. However, moose can be expected to be found in most riparian habitats within the study area drainages.

Wolves. Wolves are social, wide-ranging animals, and their activities center around packs consisting of extended families. Born in mid-May, wolf pups stay near the den until mid-summer when they join adults on limited forays. In winter, packs may travel 50 miles a day in search of their primary prey: caribou, moose, and Dall sheep. Throughout the year wolves supplement their diet with snowshoe hares, ground squirrels, voles, and occasionally fish and birds (ADF&G 1978). Because of their wide-ranging nature and diverse diet, wolves utilize a variety of habitats for seeking out prey, including riparian habitats.

Aerial surveys in 1985 estimated that nine packs comprised of 49 wolves and four to six individual wolves were using portions of the Yukon Charley Preserve (NPS 1985). More recent surveys in 1987 estimated a minimum number of 13 packs comprised of 70 wolves and seven individuals were present (Ulvi, pers. comm.). Many of the packs probably use portions of the Yukon-Charley peripherally to core home ranges outside the preserve. Average home range sizes for wolf packs in this area are not available but may be as large as 250 to 400 square miles.

All 145,943 acres in the Woodchopper/Coal/Sam Creek study area and all 30,598 acres in the Fourth of July study area are considered wolf range. Wolves have been known to utilize the Woodchopper and Coal Creek drainages, and individuals or their sign have been seen near the claim areas. It is likely that wolves use the other study area drainages as well. Most of the wolf range in the study areas remains pristine. However, wolves are commonly found along lower watercourses (riparian corridors) where wildlife (including some important prey species) tends to concentrate (NPS 1985). Thus, some of their range has been disturbed by past mining.

Birds. Riparian habitat is immensely important for resting, feeding, and breeding birds, and is generally associated with greater bird diversity and abundance than nearby upland areas (Spindler and Kessel 1980). During the nesting season, riparian habitats frequently support over 250 birds per 100 acres. The value of riparian habitat is thought to be a function of its vegetative complexity (Anderson and Ohmart 1977). Spindler and Kessel (1980) identified tall shrub in riparian areas as the most important vegetative type for birds in Alaska, with water and ground litter as important components. Ground foraging birds depend on ground litter in addition to overstory vegetation (Spindler and Kessel 1980).

Small Mammals. Riparian habitats also typically have a greater diversity and abundance of small mammals and furbearers than neighboring habitats (Cross 1985). In the interior of Alaska, riparian areas provide preferred habitat for tundra voles (*Microtus oeconomus*) and singing voles (*Microtus miurus*) (FWS 1980), and for some furbearers such as beaver, muskrat, and river otter. In response to population pressure or resource shortages in some areas, small mammals may also use riparian vegetation as travel corridors during migration to new habitats (Thomas et al. 1979).

All of the riparian vegetation in the study areas, including that found within the claim groups, is considered riparian wildlife habitat for birds and small mammals.

THREATENED AND ENDANGERED SPECIES

Plant Species

There are no plants from Yukon-Charley Rivers area officially designated as threatened or endangered. However, there are plants in the area currently being considered for designation as threatened or endangered. The U.S. Fish and Wildlife Service has established a series of categories as an interim classification to reflect current assessments of status for the candidate threatened and endangered taxa (Murray and Lipkin 1987).

Currently, four category 2 species are known to occur within the Yukon-Charley Rivers National Preserve and the surrounding area. Category 2 includes taxa for which current knowledge suggests that proposals for listing as threatened or endangered are appropriate, although data to fully support the proposals are not yet available. Within the preserve and vicinity, there are three additional species considered vulnerable, but they are not currently threatened. These taxa are endemic to Alaska and neighboring territories and qualify as sensitive taxa as defined by the U. S. Bureau of Land Management and the Forest Service (Murray and Lipkin 1987). Category 2 and vulnerable plant taxa known to occur within the preserve and surrounding area and their known range and habitat, are presented in table 9. Category 2, or vulnerable plants, have not been identified in the study areas or on any of the claims.

Castilleja annua and *Montia bostockii*, which are found within the preserve or surrounding area were withdrawn as category 2 species (both were listed as category 2 in the Federal Register of 27 September 1985) and listed as category 3c taxa because they are known to be more numerous and widespread than previously thought.

American Peregrine Falcon

The American peregrine falcon (*Falco peregrinus anatum*) is the only species listed as endangered by the U.S. Fish and Wildlife Service and the state of Alaska that is found within the preserve (sec. 7, Endangered Species Act [PL 93-205], appendix 4). The North American Lynx is currently designated as a category 2 candidate species for possible future listing under the Endangered Species Act (PL 93-205).

Protecting habitat for and populations of peregrine falcons was a primary reason for establishing the preserve (ANILCA [PL 96-487] Sec. 201[10]). American peregrines occur throughout the forested interior of Alaska. Two other subspecies of peregrine falcon that are not endangered also occur in the state: the threatened arctic peregrine falcon (*F. p. tundrius*) inhabits the northern tundra regions, and the unlisted Peale's peregrine falcon (*F. p. pealei*) occurs along coastal regions from the Aleutian Islands to the southeast panhandle. American peregrine falcons are protected by the Endangered Species Act (PL 93-205) and the Migratory Bird Treaty Act (PL 16 USC 703 et seq.), which protect eyries (nest sites) and nesting habitat (prey habitat) in the state. Bald eagles, grizzly bears, and wolves are not considered threatened or endangered in Alaska.

Peregrine falcons have been studied for many years in the upper Yukon area. Prior to 1965, it was estimated that as many as 250 pairs inhabited the interior region of Alaska (Cade 1960). Coinciding with the heavy use of DDT pesticides in the 1950s and 1960s, populations of peregrines declined until they reached record lows during 1973 through 1975. The pesticides, ingested by the peregines through eating contaminated prey, have a devastating effect on the peregrines' reproductive success. In some areas of Alaska and the 48 contiguous states, the American peregrine falcon virtually disappeared. In the Yukon-Charley Rivers area, the population declined somewhat less than in other areas. In 1970 the subspecies was officially designated as endangered by the federal government, and in 1972 the use of DDT was restricted in the United States. Limited band recoveries show that most of the Yukon-Charley birds migrate through Central America and winter in South America where the use of DDT is still prevalent. Thus, DDT continues to retard reestablishment efforts for the species. However, since restrictions were imposed on the use of DDT in the United States, signs of recovery have been observed throughout the species' range.

Table 9. Category 2 and Vulnerable Plants Found within Yukon-Charley Rivers National Preserve and Surrounding Area

Status	Species	Known Range Within Preserve and Vicinity	Habitat
Category 2[a]			
	Cryptantha shackletteana	Near Eagle; Calicio Bluff	Steep, dry, unstable, South-facing rubble slopes elevations and at the margins of sparsely vegetated grasslands
	Draba murrayi	Upper Yukon River Region from Woodchopper to Eagle	Steep, dry bluffs
	Eriogonum flavum var. *aquillinum*	Along the Yukon River between Circle and Eagle	Steep, dry, south-facing, treeless river bluffs
	Podistera yukonensis	Near Eagle; Kathul Mountain	Dry, south-facing rubble slopes and grasslands at low elevations. May occur in alpine areas
Vulnerable[b]			
	Erysinum asperum var. *augustatum*	Along the Yukon River between Circle and Eagle	Dry grassy bluffs, rubble slopes
	Papaver nudcaule spp. *americanum*	Along the Yukon River	Bluffs and cliffs
	Phacelia mollis	Kathul Mountain	Dry south-facing slopes

[a] Category 2, as established by the U.S. Fish and Wildlife Service, include taxa for which current knowledge suggests that proposals for listing as threatened and endangered are appropriate, although data to fully support the proposals are not yet available.

[b] Endemics to Alaska and neighboring territories considered vulnerable but not currently threatened (Murray and Lipkin 1987).

Population Estimates. A stable population of between 28 and 32 pairs of peregrines likely existed along the Yukon River between Circle and the Canadian border prior to the use of DDT. During continent-wide declines of peregrine falcons in 1973, the upper Yukon population was reduced to a low of 11 breeding pairs, about 35 percent of normal (Ambrose et al. 1988). In 1977, however, peregrines began to recover statewide, and by 1987 the peregrine population within the preserve numbered close to 100 percent of their estimated past levels. In 1987, 31 nest sites on the Yukon River and 10 on the Charley River were occupied producing a total of 92 young (Ambrose 1987) (Peregrine Falcon Nest Sites and Foraging Areas maps). Alaska remains the only area in the United States with substantial numbers of breeding peregrine falcons, and the falcons in the Yukon-Charley preserve represent about 25 percent of Alaska's American peregrine falcon population.

Habitat Needs. Peregrine falcon eyries are found on river bluff faces that are fairly clear of vegetation, somewhat inaccessible to predators, and relatively free of disturbance. The birds tend to mate for life and return to the same area year after year, but they do not always occupy the same nesting site. Forty seven different nest sites have been located within the preserve. Peregrines feed primarily on waterfowl, shorebird, and passerine species of birds that concentrate along river corridors. Wetland/shrub/shoreline/dwarf forest habitat complexes are believed to provide optimum prey habitat. The falcons hunt primarily by stooping or dive-bombing their prey at speeds up to 200 mph, usually striking and killing their prey with clenched talons, and retrieving the kill in the air. On the average, peregrines nesting in the preserve begin egg-laying on May 8 and begin incubation on May 12. Eggs hatch on June 15, and young begin fledging on July 24. Most birds begin their long migration south during September.

The U.S. Fish and Wildlife Service, through its recovery plan, has adopted a set of recommended restrictions aimed at reducing human disturbance of peregrines during critical nesting periods and at protecting the prey habitat that supports these birds. Human disturbance has varying effects on peregrines, ranging from no reaction to human activities as close as 100 feet to the nest, to severe aggressive reactions such as screaming at low-flying aircraft and attacking intruders as far as one mile away.

The U. S. Fish and Wildlife Service recommended restrictions are as follows.

Within 1 mile of an active nesting site

-aircraft prohibited below 1,500 feet above ground level between April 15 and August 31
-all ground activities prohibited between April 15 and August 31
-significant habitat alterations and permanent facilities prohibited at all times

Within 2 miles of an active nesting site

-activities producing high noise levels prohibited between April 15 and August 31
-permanent facilities producing high noise levels, sustained human activity, or altering high quality habitat including ponds, lakes, rivers, and wetlands are prohibited

Within 15 miles of active nest sites.

-alterations of limited high quality habitat required to support prey prohibited
-use of pesticides prohibited

Peregrine Falcon Habitat - Woodchopper/Coal/Sam Creeks

There are no known peregrine falcon nesting sites within the Woodchopper/Coal/Sam Creeks drainages. Bluff formations within the drainages are few, and those that exist have little potential as future nest sites because of their distance from the Yukon River. Peregrines are also unlikely to nest up these smaller Yukon tributaries because of lower prey densities

Eight peregrine eyries (USFWS numbers 149, 155, 166, 180, 183, 187, 191.5, and 199) are located within what may be considered a probable foraging distance (within 10 miles of the nest site) to the study area drainages. The use of the these drainage by falcons for hunting is unknown, but it is believed to be small. Most birds probably forage along the Yukon River and its larger tributaries (e.g. the Charley and Kandik Rivers) where higher densities of waterfowl, shorebirds, and passerines may be found. Use of the study area by peregrines probably occurs primarily where the creeks meet the Yukon River, especially in areas where wetland/shrub/shoreline/dwarf forest habitat complexes exist. However, since many of the peregrine's prey species are found in the upper portions of the Woodchopper, Coal, and Sam creek drainages, some use of the area may be expected to occur.

All of the riparian habitat within the claim areas is considered low quality peregrine falcon prey habitat.

Peregrine Falcon Habitat - Fourth of July Creek

There are no known peregrine falcon nest sites within the Fourth of July Creek drainage. However, some bluff formations provide a potential for future nest sites, namely those located on the northwest side of Fourth of July Creek where it nears the Yukon River Valley. These bluffs have characteristics that typify peregrine falcon nest sites found in other areas of the preserve. At least one golden eagle nest has been located there.

Five peregrine eyries (USFWS numbers 83, 90.5, 93, 95 and 112) have been located within a probable foraging distance (within 10 miles of the nest site) to the study area drainage. The area where Fourth of July Creek enters and passes through the Yukon River floodplain is probably used regularly by hunting peregrine falcons. Wetland/shrub/shoreline/dwarf forest complexes in this area provide habitat for a number of peregrine falcon prey species, and one eyrie has been located directly across the Yukon River from here. Areas upstream of the Fourth of July canyon mouth and near the claim groups may also provide some potential for falcon foraging.

All of the riparian habitat within the claim areas is considered low quality peregrine falcon prey habitat.

VISUAL QUALITY

Yukon-Charley Rivers National Preserve is typical of the Northern Plateaus physiographic province and contains all the topographic features common to the province. Within its boundaries the preserve contains all or portions of four major drainages (Yukon, Charley, Kandik, and Nation) and each has its own scenic character.

Throughout most of its 130-mile traverse of the preserve, the Yukon is bounded on one or both sides by bluffs and mountains that rise rapidly from river level. Although most of these bluffs are no more than a few hundred feet high, some rise sharply 1,100 to 2,100 feet above river level, such as near Calico Bluff, Biederman's Bluff, Woodchopper Canyon, and Kathul Mountain. These high and exceedingly rugged bluffs form some of the most spectacular scenery associated with the rivers of the interior of Alaska.

To the south of the Yukon River, rolling uplands give way to a rugged mountain province where several peaks reach an elevation of 6,500 feet or more.

The preserve includes the entire vast Charley River basin, a pristine watershed containing one of the most scenic clear-flowing streams in this part of Alaska. The Charley drainage is deeply incised into the mountainous terrain, and topographic relief on the order of 4,000 feet within a very few miles is common in the area. Perhaps the most appealing aspect of the scenery of the preserve is the great expanse of natural landscape. This pristine landscape character is a major attraction for a small number of visitors.

The preserve includes examples of all vegetative types in east-central Alaska and supports populations of a variety of large mammals, including Dall sheep, moose, caribou, brown/grizzly bear, black bear, wolf, and lynx. Besides being highly scenic, the precipitous bluffs along the Yukon and the major tributary rivers provide protected breeding habitat for more than 40 pairs of American peregrine falcons, one of the largest breeding populations of this endangered species in Alaska and the lower 48 states.

CULTURAL RESOURCES

Prehistory and Ethnography

At the height of the last glaciation, about 18,000 B.P. (before the present), most of western North America, north of the 47th parallel, was completely covered by two vast ice sheets--the Cordilleran in Alaska and western Canada, and the Laurentide to the east. An ice free corridor, through central Alaska and the Yukon Territory continuing south to the continental United States remained open throughout most of this period of glaciation. Yukon-Charley Rivers National Preserve lies at the northern mouth of this corridor, which served as a conduit for human immigration to North America from Asia.

The earliest firmly dated site in Alaska, the Dry Creek site, is dated to 11,000 years B.P. The lack of heavy glaciation during the later portion of the Pleistocene age, as well as the location of the drainages in the preserve, along the northern portion of the corridor, suggests very good potential for the occurrence of early man sites within the region.

It is believed that Pleistocene age people exploited the relatively rich grassland environment, which supported large mammals including the mammoth, horse and bison. The earliest known subsistence pattern for Alaska appears to be that of small nomadic groups occupying temporary hunting camps while utilizing seasonal resources.

Although little understood, there is a hiatus of archaeological sites throughout Alaska that dates approximately between 8,000 and 6,000 B.P. One possible factor that may account for this is that the climate was changing from a drier, cooler, grassland environment to a warmer, wetter, boreal forest environment found today. Subsistence strategies also changed. Analysis of lithic assemblages and faunal remains on archaeological sites from this time period suggest that people shifted from an almost exclusive dependence on big game to a more dispersed and varied means of obtaining food.

Archaeological investigations conducted within, and adjacent to the preserve, indicate the potential for all recognized Alaska Archaeological Traditions to occur within the region. These include the "Chindadn" early sites, the American Paleoacrtic, Northern Archaic, and Athapaskan Traditions which span the period from 1,100 years B.P. through the 1800s (Cultural Resource Sites map).

Athapaskans inhabiting the preserve at the time of Euro-American contact in the nineteenth century are known as the Han. They followed a subsistence round involving winter residence in semi-subterranean moss-covered lodges near the Yukon River. At times when migratory fish were not readily available, the people hunted caribou and other game, living in moveable skin-covered dwellings. Residence was usually determined by the location of resources.

These people were profoundly affected by Euro-American contact. It appears that the establishment of trading posts along the Yukon River encouraged a shift from the dispersed hunting/fishing seasonal round to a greater concentration on riverine resources. Caribou hunting may have become less important as Euro-American canvas, canned goods, flour, guns, and iron tools replaced the hide, meat, and bone, of these large mammals. As a result, the semi-permanent fishing villages observed along the river by Euro-American explorers may not characterize the earlier Athapaskan settlement patterns for resource exploitation. The effects of Euro-American diseases on the population may have substantially altered their settlement patterns and belief systems, thus affecting their independence.

Few of the Han who now live near Yukon-Charley Rivers National Preserve are engaged in traditional subsistence activities. Some of the traditional values and lifeways survive at Eagle Village and Circle, and certain non-native subsisters are learning and practicing a few of the old ways and crafts of the Han Athapaskans.

History

Europeans are not known to have visited the area encompassed by the preserve until 1851 when Robert Campbell, a bible-carrying, fur trader employed by the Hudson's Bay Company, made a four day trip from Fort Selkirk down the Yukon River to Fort Yukon.

American members of the Western Union Telegraph Exploration Expedition passed through the upper Yukon area in 1869. Other visitors included the French-Canadian traders Francois and Moise Mercier, and gold miners-turned-traders Jack McQuestern, Arthur Harper, and Jack Mayo who traded regularly with the Han Athapaskans of the upper Yukon. Francois Mercier constructed a trade cabin at David's Village, 12 miles up river from the present-day preserve. As late as 1874, few Euro- Americans lived or had even traveled in the upper Yukon region.

The discovery of gold changed all of that. While there are vague reports of gold being discovered on "Preacher Creek" as early as 1863, it was not until the 1880s that mining on any measurable scale took place. In those years miners prospected the Fortymile and Stewart rivers (1882), the American and Seventy-Mile rivers (1882), and Birch Creek (1893). Using small-scale hand mining equipment--usually a gold pan, shovel, and sluice boxes--these miners reportedly took $100,000 worth of gold from the Stewart River District in 1885-1887. Mines on the Fortymile River are said to have produced $60,000 in 1886.George Carmack's discovery of gold on Bonanza Creek in the Canadian Klondike in the summer of 1896 brought thousands of fortune seekers to the region and changed the course of history.

The prospectors who braved the dangers of the Chilkoot and White passes arrived in the Canadian Klondike only to find the most promising streams had long-since been staked. So some of the miners struck out in all directions to find their own claim. Heavy Canadian taxes caused a considerable number to gravitate to the streams and valleys on the American side of the border. As the gold seekers rushed from one reported strike to another, they explored, prospected, and staked every stream and valley along the Yukon, including those in the present-day Yukon-Charley Rivers National Preserve. It is a curious geological condition that only streams that enter the Yukon River from the south bear gold. By 1896, Fourth of July Creek and Seventymile River had been staked. There were reports of discoveries on Coal and Woodchopper creeks, but neither creek would be worked for several more years. Coal was discovered along Bonanza, Coal, and Washington creeks, and on the Nation River. Between 1897 and 1902, approximately five tons of coal were produced on Washington Creek.

Within a short period of time, gold camps were constructed. Ivy City, located near the mouth of Fourth of July Creek, and Nation City, situated below the mouth of the Nation River, were built because of good prospecting reports at Fourth of July Creek. The settlement of Independence consisted of 8 to 10 cabins at the mouth of the Charley River in 1898. During that same year, miners also laid out the short-lived town of Derwent, near the mouth of the Charley River. Local legend holds that the yet to be located town of Bonanza existed somewhere on Bonanza Creek. Seventymile City and Star City grew out of a strike on the Seventymile River. And Circle City, which had been started earlier thirty miles down the Yukon River, was quickly repopulated to become, once again, "the Paris of Alaska." The boom town of Eagle City, which grew out of a strike on American creek in 1898, had a population of almost 1,700. Eagle residents voted in 1900 to become the first incorporated city in the interior of Alaska. Eagle became the seat of Alaska's judicial district, and its port-of-entry from interior Canada. Fort Egbert was built at Eagle and served as the U. S. Army's district headquarters. Across the Canadian border was Dawson City, which was the largest city north of San Francisco by 1898.

The rapid influx of people to the upper Yukon created a vastly increased demand for food and supplies in the interior. A river transportation system developed, but in the early days of the gold rush the steamboats sometimes experienced considerable difficulty in meeting the demand for supplies. Miners in Circle once used armed force to take food from passing steamboats. In the autumn of 1897, the U. S. Congress responded to reports of hardships of the Yukon miners by purchasing and importing 539 domesticated reindeer from Lapland for food. Only 144 reindeer survived the journey to Circle City. By the time they arrived in May of 1899, the crisis had passed and the reindeer were not used for food. By 1898-1899, some 100 steamboats plied the Yukon River, providing an adequate flow of food and supplies during the summer season.

During the eight or more months when ice prevented riverboat travel, dog teams traveled the 160-mile Circle to Eagle trail and carried mail and supplies to the people living in the isolated camps and cabins along the Yukon and its tributaries. A number of roadhouses were built to accommodate the needs of travelers. Some of those old roadhouses are still standing, including the ones on Woodchopper and Washington creeks, Frank Slaven's place, Tom Wing's place, and Ed Biederman's fish camp.

The people who journeyed into the Upper Yukon at the turn of this century moved back and forth across feeder streams and gulches at a frenzied pace, motivated by each new rumor of a gold discovery. Then, almost as quickly as it began, the gold rush in the Yukon passed. Rumors of richer finds elsewhere drew people away which included reports of fortunes to be made in Nome in 1899, and the new find on the Tanana River in 1902. In less than four years all of the small communities on the American side of the border, except Eagle and Circle, had all but disappeared, and the population of those two communities dwindled to only a few people.

Not all of the people who had immigrated into the upper Yukon followed the siren's song of unimaginable wealth to be found on other rivers or at Nome. A few determined men and women remained on the streams that feed the Yukon River. In 1901, for example, John C. Boyle filed claims on Mineral and Iron creeks. Frank Slaven, who first came into the country during the Klondike gold rush, staked his Discovery Claim on Coal Creek in 1905. A Dr. Pratt discovered gold on Surprise Creek in 1907. For at least two more decades, even occurred on the Charley River, although mining there was not successful.

The people who stayed experienced some success. In 1906, as much as $18,000 worth of gold was produced from Mineral Creek, a tributary of Woodchopper Creek. Total gold production of the region between 1904 and 1911 was reportedly $150,000 with most of that coming from Mineral and Fourth of July creeks. Two men mined intermittently, between 1905 and 1934, using drift and open cut methods just below Boulder Creek, a small tributary of Coal Creek. They worked approximately 50,000 square feet of gravel and recovered $35,000 worth of gold. Frank Slaven reportedly recovered nearly as much by processing about half the amount of gravel on his claim in the years before 1914.

Most of the miners who stayed worked a small area by a variety of methods and found enough gold to tie them to the land. The meager amounts of gold that came from the streams had to be supplemented with income that came from activities such as trapping, cutting wood for the steamships that operated on the Yukon, carrying the mail, or, as in the case of Frank Slaven, operating a roadhouse.

The distribution of gold in the drainages on the south side of the Yukon River was often so irregular that the gravel in which it was found was worth only pennies a yard. In some places, miners had to process as much as 70 to 80 cubic yards of gravel to extract a single troy ounce of gold at Coal Creek. The gravel lay beneath a layer of frozen mud, silt, decayed organic matter, and ice seams (muck) that could be as much as 28 feet deep. A profitable operation required the ability to process and recover gold from massive amounts of gravel. In 1920, a miner named Taylor attempted, with some success, to overcome this problem by consolidating claims on Fourth of July Creek and bringing in a Bagley Scraper from the states. Short-lived attempts were made to conduct mining on Coal Creek using large-scale equipment in 1924 and 1927-1928. However, most miners possessed neither the technical knowledge nor the financial backing to acquire the enormous amounts of food and supplies, hire large crews, and transport hundreds of tons of equipment to the remote upper Yukon.

In 1934, Ernest Patty, a mining engineer and future president of the University of Alaska, and General A. D. McRae, a Canadian financier, conducted an extensive sampling program at Coal Creek. On the basis of the results of this testing, they concluded that gold mining could be carried on profitably by dredge on Coal and Woodchopper creeks. They purchased the rights to existing claims on both creeks, constructed camps, and imported a dredge with four cubic-foot capacity buckets from San Francisco. The dredge cost $105,929.04, including $27,000 in shipping fees. Patty and McRae began dredging operations on Coal Creek in 1935 and on Woodchopper Creek in 1937. Records of their operation on Woodchopper Creek, known as Alluvial Golds, Inc., and on Coal Creek, Gold Placers, Inc., prove they were correct in their assessment that large-scale placer mining could be carried on profitably. Between 1935 and 1940, the two companies recovered 33,758 ounces of gold and 3,667 ounces of silver, valued at $1,183,585.70, from Coal Creek.

In October of 1942, the federal government closed down gold mining operations in order to release men and equipment for the war effort. Most of the gold mines in Alaska closed down. Placer mining resumed in the upper Yukon region including the dredge operations on Woodchopper and Coal creeks immediately after the end of World War II. In 1945, gold worth $123,130.49 was recovered from Coal Creek. During the following year, Woodchopper Creek was the third highest placer gold producer in the territory. In 1948, Yukon Placer Mining Company built a road to its claims on Fourth of July Creek and brought in heavy equipment. The company processed 70,000 cubic yards of gravel by hydraulic methods in 1949, recovering 1,372 ounces of gold and some silver.

Although gold mining continued in the upper Yukon region into the 1950s, the general trend was one of decline. Increases in the cost of supplies and labor in the postwar years and weakening paystreaks on some streams such as Coal Creek, combined to narrow the profit margin of the operators. For example, Gold Placers, Inc. recovered gold worth $136,825.00 from Coal Creek in 1946, but reported a profit of only $2,804.90. In 1954, the White Pass and Yukon Company discontinued steamboat freight service on the Yukon River. This forced operators to depend on air transportation, which dramatically increased shipping costs on supplies and equipment.

The Coal Creek dredge did not operate in 1952, and Gold Placers, Inc. closed its operation permanently in 1957. Tedd C. Mathews, a Fairbanks mining engineer, leased the Coal and Woodchopper creek properties. However, he was unable to turn a profit working on Woodchopper Creek in 1961 and Coal Creek in 1962-1964. Joe Vogler began operating on Woodchopper Creek in 1971. A succession of operators worked the claims on Coal Creek, including Ernest Wolfe and several partners (1972-1976), Au Placers, Inc. (1976-1977), Lomerson Ltd. (1977-1985), and Coal Creek Properties (1985-1986). All of these operators had difficulty making a profit because of high production costs. The Coal Creek dredge was last operated for a short time in the mid-1970s.

Available production figures indicate that gold mining activity in the Yukon-Charley Rivers National Preserve during the last decade has been largely recreational or was carried out to maintain equipment. In 1986, Coal Creek Mining Properties donated its claims and the Coal Creek dredge to the National Park Service. This merely confirmed that the era of profitable placer mining on the upper Yukon had long since passed.

Resources

To date, approximately 200 historic sites, and over 100 prehistoric sites have been documented within the preserve. While the archaeological investigations have not uniformly examined all possible environments within the preserve, areas examined include: the uplands found along the upper Copper Creek and 70 Mile River, portions of the Charley River, and areas along the Yukon Corridor.

These investigations have documented a variety of site types including small surface evident lithic sites, caribou fences, overlook sites, stratified occupations, and lithic remains extending along one ridge system for approximately two miles. The later period sites, termed the Athapaskan Tradition, appear to represent the full range of known subsistence activities.

To date (June 1988), archaeological surveys have been conducted along the mining drainages covering approximately 137 unpatented placer claims. The results of these investigations have been the documentation of 44 historic properties, and 2 prehistoric sites. The evaluation of the sites for National Register eligibility is currently ongoing.

The archaeological investigations consist of a prefield literature review, intensive pedestrian survey, and evaluation of findings. The survey crew consists of several field archaeologists, a historian, and a historical architect. The survey universe consists all drainages containing valid mining claims. Typical survey coverage is "Intensive" as defined by the secretary of the interior's standards and guidelines. This includes a pedestrian survey of the claim areas sufficient to insure that all surface cultural resources within the area of examination will be located. Examination of all vertical exposures, such as road cuts, stream banks and earlier mining exposures are made. Standardized forms are utilized for tracking survey areas, and documenting all finds.

Cultural resource surveys undertaken to gather data for this environmental impact statement have been limited to the drainages that may be mined in the future. The location of existing claims may not correlate with the areas used by prehistoric inhabitants of the region. The claims are concentrated in the drainages where minerals were most abundant, and next to streams since most mining techniques have historically required abundant water. These landforms within the mining areas have not yet yielded any prehistoric remains during investigations.

Unfortunately, the rarer and more significant sites anticipated for the Yukon-Charley area tend to be vegetated, and exhibit surface remains only when truncated by road cuts, streams, or other disturbances. Current archeological field methods are insufficient to find deeply buried, undisturbed sites. Therefore, it is possible that significant prehistoric sites may yet be found in the mining areas.

In addition, archeological interest is not limited to the prehistoric and Athapaskan sites found in the park. All of the 40 historic sites found in the claims areas have the potential for yielding important scientific data of interest to historical archaeologists.

Prehistoric Sites

Two prehistoric sites were located on a ridge between two drainages, outside of existing claim boundaries. These were both typical, surface-evident lithic scatters of an undetermined age.

Historic Sites

Numerous historic sites and structures associated with gold mining or mining related activities have been located in the Yukon-Charley Rivers National Preserve. Most of these sites are located along the banks of the Yukon River and its tributaries, and many are within the boundaries of the present study area. The Woodchopper and Frank Slaven roadhouses, the Ed Biederman Fish Camp, and the George McGregor Cabin are sites that were included in a thematic nomination of "Yukon River Lifeways" that was placed on the National Register of Historic Places in July of 1987. A National Register nomination is currently being prepared focusing on the Coal Creek mining district. Structures and features included in the nomination will be the 1935 dredge, a mining camp at Beaton's Pup, dredge tailings, a water diversion system, and other structures and equipment associated with dredging on Coal Creek.

A National Park Service cultural resources field team located and recorded over 40 historic sites on unpatented mining claims along Woodchopper, Ben, Sam, Fourth of July, Boulder, and Coal creeks and their tributaries in 1986. This field reconnaissance covered 4,635 acres and almost 23 miles of access road corridors. Many of the historic sites are located on or adjacent to existing mining claims where they may be impacted by further mining activity, depending upon the specifics of each mining plan.

Most of the historic sites that were inventoried are associated with placer mining. They include examples of drift and open cut mining methods, and small and large-scale hydraulic mining sites. Other sites found include structures such as cabins, sheds, and tent frame platforms; a mining camp with variety of structures; remnants of water diversion systems, such as dams, ditches, flumes, and pipelines; mining engineering works such as open cuts and prospect pits, drift shafts, and tailing piles; mining equipment, such as steam boilers and sluice boxes; and other mining related artifacts, including trash scatters. Many of these sites represent examples of changes in mining technology over the last 85 years. Three of the cabin sites may be associated with fur trapping activities.

Historic sites are impacted by a variety of factors which affect their condition. Sites located along streambeds or near creek banks frequently have been impacted by subsequent mining operations and/or erosion. The passage of time, weathering effects, periodic reutilization, or lengthy periods of abandonment have impacted the integrity the sites and their interpretative value. Structures and equipment at most of the sites have been altered, reused, or removed by subsequent miners or have been vandalized by the public, depending upon the accessibility of the sites. Access roads to new mining sites have increased the potential for further disturbance and vandalizing of sites.

An evaluation of the condition and significance of each site under the criteria for the National Register of Historic Places is currently under way. Until the evaluation process is completed, all sites that have not been evaluated to date will be treated as though they are potentially eligible for the National Register.

SUBSISTENCE USE OF RESOURCES

Subsistence uses by local rural reidents are to be allowed in national preserves by Title II of the Alaska National Interest Lands Conservaion Act of 1980 (ANILCA [PL 96-487] sec. 203). In compliance with Section 810 of ANILCA (PL 96-48') an evaluation of subsistence activities in Yukon-Charley Rivers National Preserve was completed (appendix 11). There are approximately 400 local rural residents in the Yukon-Charley region eligible to use the preserve resources for subsistence purposes. The National Park Service estimates that about 100 individuals (20 families) regularly use the various resources of Yukon-Charley Rivers National Preserve for subsistence NPS 1986; Alaska Department of Labor 1987). The overall pattern of subsistence-resources use in the region of Yukon-Charley Rivers National Preserve is given below. The area of major subsistence use in relation to the preserve extends along the Charley, Yukon, Kandik, and Nation Rivers. Along the Yukon, the residents of Circle, Eagle, and Eagle Village practice subsistence activities in the preserve, as well as about 25 people who actually live within the boundaries of the preserve. Access for subsistence purposes is generally by foot, motorboat, snowmachine, or dogsled.

The Yukon-Charley subsistence region for the table of estimated subsistence harvests is not the entire region used by the people of the communities of Circle, Eagle, and Eagle Village or by other eligible persons. We assume that each village has a loosely defined sphere of resources use that includes, but it not limited to, the preserve. Nevertheless, the National Park Service recognizes that Yukon-Charley National Preserve may be especially important to certain communities and households in the area for subsistence purposes. Thus, the estimates of subsistence harvests in table 10 have been modified to cover a lesser region along the Yukon corridor from Eagle Village downriver to Circle. The subsistence region was reduced for purposes of analysis to focus upon those areas more in proximity to Yukon-Charley Rivers National Preserve. In general, the National Park Service estimates that subsistence harvest within the preserve constitutes approximately 25 to 30 percent of the Yukon-Charley reduced regional subsistence pattern selected for analysis for certain species.

The harvest figures represent very rough estimates extrapolated from a variety of sources, listed in the bibliography, for a so-called typical year (table 10). The sources include technical reports of the Alaska Department of Fish and Game and the preserve staff. The methodology consists of averaging any total annual harvest figures per species that may be reasonably attributed to the local residents of the cited villages. Harvest figures available for a larger or smaller area than the subsistence region defined by these villages were adjusted by appropriate percentages. The regional subsistence pattern of Circle, Eagle, and Eagle Village, including the preserve, is characterized by the proportions indicated in table 10 under the percentage column (edible weight for purposes of species comparison). These percentages are based upon total edible weights per species and the conversion factors in technical paper number 107, of the Alaska Department of Fish and Game, Division of Subsistence, listed in the references.

Woodchopper, Coal, Sam, and Ben creeks comprise one study area and Fourth of July Creek the other. A limited amount of trapping may occur along these drainages by a few persons. However, the major locally important subsistence species are fish and moose as reflected in the estimated harvest figures that follow. Both of these are harvested mainly along the Yukon River and its major tributaries.

In addition to black and brown/grizzly bears, the list of subsistence species above includes several varieties of berries from blueberries to salmonberries. "Fish" includes chum and king salmon, grayling, longnose sucker, northern pike, and sheefish. "Firewood" refers to cutting birch and white spruce for home heating. The category of "furbearers" comprises beaver, coyote, ermine, lynx, marten, mink, muskrat, red fox, red squirrel, river otter, wolf, and wolverine. "House logs" are mostly white spruce. "Plants" consist of rose hips and other edible plants not included in the "berry" category. "Small game" includes gallinaceous birds such as ptarmigan and ruffed and spruce grouse as well as porcupine and snowshoe hare. A subsistence harvest in any given year may vary considerably from previous years because of such factors as weather, migration patterns, and natural population cycles. However, the regional pattern is assumed to be generally applicable to subsistence harvests in recent years.

Potential subsistence pressures on the Yukon-Charley area stems from an estimated population of 392, including 79 Han Athapaskans at Eagle Village, with only about 100 people considered to be actively engaged in subsistence pursuits within the preserve. Compared to the estimated maximum aboriginal population of 500 on what is now the American side of the international border (Crow and Obley 1981).

RECREATION AND VISITOR USE

Recreational opportunities in Yukon-Charley Rivers National Preserve include most activities that are commonly associated with Alaska: hunting, fishing, camping, sightseeing, boating, hiking, and nature study. The Taylor Highway is the primary tourist route between the Alaska Highway and the community of Eagle. The Steese Highway connects Circle and Central with Fairbanks and is a popular route for out-of-state tourists as well as residents of Fairbanks seeking outdoor recreational opportunities. Most recreational activity in the preserve is by people who live within a 250 mile radius of its boundaries.

Table 10. Estimated Subsistence Harvests, Yukon-Charley Rivers National Preserve, Alaska

Resource	Regional Harvest	Estimated Percent Total Edible Weight	Park/Preserve Portion of Regional Harvest
Bears			
black	17 animals	2	5 animals
brown/grizzly	39 animals	4	10 animals
Caribou	29 animals	3	8 animals
Dall sheep	15 animals	1	3 animals
Moose	40 animals	13	11 animals
Fish	9,708 fish	70	2,621 fish
Furbearers	1,704 animals	4	460 animals
Berries/other plants	883 pounds	1	239 pounds
Small game	726 animals	1	196 animals
Waterfowl	300 animals	1	170 animals
Firewood	311 cords		84 cords
House logs	313 logs		85 logs

Formal collection of visitor-use data of the preserve began in 1982. Consequently, use trends specific to Yukon-Charley cannot yet be established. Table 11 represents monthly public use numbers for the preserve over the last five years. These figures show relatively limited use and that approximately 70 to 80 percent of recreational use in the preserve is in the four-month period of June to September.

Within the preserve boundaries, the most popular recreational activities are hunting, floating rivers, and aerial sightseeing. Visitors primarily come to the preserve to enjoy one of these activities and to camp, hike, and to enjoy observing and photographing the preserve's wildlife and scenery. Sport hunters, as well as subsistence hunters, are active along the Yukon River corridor and the lower portions of its major tributaries during the fall hunting season. Most hunting occurs near the river corridors where access by powerboats, canoes, and rafts is relatively easy and inexpensive. The limited amount of backcountry hunting is accessed by light aircraft. Guided hunting takes place in portions of the preserve as well as adjacent areas and is geared toward Dall sheep, caribou and brown/grizzly bear.

River running in the preserve appears to be growing in popularity. The portion of the Yukon River beginning at Dawson and continuing downstream through the preserve comprises one of the most scenic, yet safely usable stretches of any large river in North America. The tributaries of the Yukon, including the designated Charley Wild River, offer river travelers outstanding boating opportunities.

Recreational use in the winter is restricted by the severe climate and extreme remoteness, but is slowly increasing. Dog mushing and cross country skiing are typical winter activities that take place in the preserve.

The types of recreational opportunities found in the Woodchopper/Coal/Sam Creeks or Fourth of July Creek study areas are no different than they are in the preserve as a whole. Because the majority of recreational use occurs along the major river corridors, the two study areas have relatively little recreational use.

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Table 11. Recreational Use in Yukon-Charley National Preserve

	Recreational Visits				
	1983	1984	1985	1986	1987
January	12	15	7	20	20
February	17	37	18	55	70
March	19	44	123	37	85
April	27	30	90	20	35
May	40	37	101	75	50
June	85	142	277	207	200
July	314	234	499	360	386
August	253	201	492	297	232
September	128	182	361	386	455
October	25	25	65	210	100(est.)
November	15	20	20	20	20(est.)
December	20	21	20	20	20(est.)
Totals	955	988	2,073	1,707	1,673

In September 1986, the unpatented mining claims including Coal Creek Camp, Slaven's Roadhouse, and the dredge were donated by the owners to the preserve through the National Parks and Conservation Association. Slaven's Roadhouse is presently used as a visitor shelter and information station. Coal Creek Camp is used as an administrative site.

The gold rush era and placer mining are a major interpretive theme in the preserve; therefore, historic structures and equipment also increase the quality of the recreational experience.

WILDERNESS VALUES

The purpose of this document is to present the impacts of implementing the EIS alternatives on wilderness values (see below). With respect to wilderness, it is not the intent of this document to evaluate the suitability of any lands in the study area(s) for wilderness designation.

The Wilderness Act of 1964 (PL 88-577) established a method of designating eligible federal lands as additions to the National Wilderness Preservation System. Section 2(c) of the act defines wilderness and generally characterizes the types of wilderness values which existed in the area prior to intensive human activity, and the values which this document addresses.

> A wilderness, in contrast with those areas where man and his own works dominate the landscape, is hereby recognized as an area where the earth and its community of life are untrammeled by man, where man himself is a visitor who does not remain. An area of wilderness is further defined to mean in this Act an area of undeveloped Federal land retaining its primeval character and influence, without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions and which

> (1) generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable; (2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation; (3) has at least five thousand acres of land or is of sufficient size as to make practicable its preservation and use in an unimpaired condition; and (4) may also contain ecological, geological, or other features of scientific, educational, scenic, or historical value.

As required by section 1317 of ANILCA (PL 96-487), the National Park Service began a wilderness review in 1984 by evaluating NPS-administered nonwilderness lands to determine which lands would qualify for wilderness designation. This suitability review was incorporated into the 1985 General Management Plan for the Yukon-Charley Rivers National Preserve.

The wilderness suitability review found approximately 1,815,370 acres suitable for wilderness designation in the preserve which is approximately 72 percent of the total acreage of the preserve and 85 percent of the Federal acreage of the preserve. This estimation has subsequently been altered due to land status changes (land and mining claims donated to the National Park Service) and application of the criteria applied to other Alaskan parks resulting in the identification of 2,220,576 acres (88 percent) of the preserve as suitable for wilderness designation.

A Final Environmental Impact Statement (FEIS) for Wilderness Recommendation addresses possible wilderness designation alternatives and has been issued. A proposed action and two alternatives were examined for possible wilderness designation. Under the proposed alternative, about 49 percent of the lands found suitable for wilderness designation would be given that designation. This area does not include the Fourth of July Creek nor the Woodchopper/Coal/Sam Creek study areas due to existing development, tailings piles, mining claims, and existing trails that traverse the area.

SOCIOECONOMIC ENVIRONMENT

Population

The Yukon-Charley Rivers region is sparsely populated. It differs from most national park units because major roads do not border or penetrate the preserve boundary and major communities are not found within or bordering the preserve. Within a radius of 50 miles of the preserve, there are four communities considered to be census-designated places. Table 12 shows the population of these communities as well as those larger communities within a 250 mile radius of the preserve. There are approximately 25 people who actually live within the boundary of the preserve.

Community Descriptions

Eagle is at the end of the Taylor Highway, about 12 river miles south of the preserve boundary. At Eagle, a U.S. Customs station and post office and an Alaska Division of Highways field station provide a few jobs, as do three general stores, a hardware store, a gift shop, an air taxi, three rental cabin operations, a small medical clinic, three gas stations, and the National Park Service. A local resident operates an electrical utility plus a telephone system. Several residents offer sightseeing boat trips along the Yukon River, and one outfitter offers float trips on area rivers, including the Charley. Some of the residents make crafts for sale to tourists. However, a relatively high number of people are unemployed. Eagle Village is a native Han Athapaskan Indian community.

Circle is a community that is at the end of the Steese Highway, about 14 miles north of the preserve. Local businesses include a telephone company, electrical utility, liquor store and trading post, cafe and air taxi. Some jobs are provided by the school system and post office.

Table 12. Populations of Communities Around Yukon-Charley National Preserve

Primary Communities	1980	1985
Eagle City	110	194
Eagle Village	54	79
Central	36	42
Circle	81	94
Secondary Communities		
Chicken	37	48
Tok	589	692
Fairbanks	22,645	27,099

Sources: 1970, 1980 U.S. Census; Alaska Department of Labor 1986

Central is a small community with some local stores and services, but employment is mostly mining related. A year-round highway maintenance facility and a summer Bureau of Land Management fire guard station arelocated in this community. The Steese highway is now maintained in winter which provides year-round access to and from Fairbanks.

Circle Hot Springs is open the year around. However, staff and services at lodges and cafes are greatly reduced in the winter.

The present local market economy of the Yukon-Charley Rivers area is tied to the regional economy of interior Alaska centered in Fairbanks, and to a lesser extent, to the communities along the Alaska and Taylor highways. Few opportunities for wage employment exist in Eagle, Central, or Circle. Those jobs that do exist include government services such as teachers, teachers aides, other school support staff, highway maintenance crews, seasonal firefighters, city clerks, city service contractors, the postmaster, and NPS staff.

Some local residents leave their communities in summer or winter to find seasonal wage employment in Fairbanks or elsewhere in the state. Some may find jobs working on highway construction crews in the area, as emergency firefighters, or in the oil and gas industry. Some residents are retired and live there in the summer only, moving elsewhere for the cold winter months. Most residents remain in the area year round and switch jobs with the seasons or engage in seasonal subsistence activities. Subsistence harvests are an important contribution to the food and home needs of local residents. These harvests constitute a form of income because their equivalents, if not harvested, would have to be purchased with cash if available.

Economic Role of Mining

Expenditures made by Alaska placer miners for labor, goods, and services were approximately $75 million in 1985. In 1985, the Alaska placer mining industry contributed $63.4 million in expenditures to the State economy. Of these expenditures, about 36 percent were made in Fairbanks, and 23 percent in Anchorage. Placer mining is a major contributor to the economy of rural Alaska including about 18 percent of the total expenditures made in small communities around the state.

In 1985, placer mining activities accounted for approximately 1,678 full-time equivalent jobs statewide. About 31 percent of the placer mining work force resides in Fairbanks, 16 percent resides in Anchorage, and about 34 percent of the work force comes from rural Alaska.

In addition, the placer mining industry has a large indirect impact on the economy of the state. The total impact on sales in the Alaska economy is $127.4 million. The income multiplier results in total wages and salaries resulting from placer mining of $33 million and an estimated 841 people employed by support industries serving placer mining.

Statewide, gold production has increased in the 1980s. For a period between 1982 and 1985, this increase was due to the increased production by large- and medium-sized mines. In 1985, there were 46 fewer recreational/assessment mines, 63 fewer small mines, and two fewer medium-sized mines than in 1982. In 1985, however, there were 14 more large placer mines statewide than in 1982 (ADCED 1982). Total reported 1985 gold production was 190,000 ounces.

Analysis of the role of mining in the local economy includes two parts: mining employment and the expenditures made by the mining industry for the purchase of goods and services. Because there are no accurate records available that provide mining income or actual mining impacts on the local economies, a publication of the Alaska Department of Commerce and Economic Development (ADCED 1986), titled The Role of Placer Mining in the Alaska Economy - 1985 in which a comprehensive survey of miners was conducted, and a 1987 Bureau of Mines publication, titled Cost Estimation Handbook for Small Placer Mines (BOM 1987) are the primary sources for estimating these variables. By analyzing the results of this survey and other information in these two documents, and combining it with data about the actual mining operations that were in progress in a certain year, it is possible to estimate the expenditures and employment generated by the mining activities in the two study areas.

Mining activities in the Yukon-Charley National Preserve rely less on rural business than the ADCED study indicates because of the relative proximity to Fairbanks and the lack of regional distribution type communities. Therefore, for the purposes of this analysis, it is assumed that 15 percent (instead of 18 percent) of all mining expenditures from mining activities in the preserve would go to small communities within 250 miles of the preserve.

Mine operation patterns in Yukon-Charley are different from those in other Alaska park units. Although 1985 was the last year of mining operations before the court order took effect, 1983 was the last year in which any substantial mining occurred in the preserve. There was very little activity in 1984 and 1985, and there has not been activity since 1985. The year 1983 is analyzed to show what impact mining activities might be expected to produce in the local economies of communities around the preserve.

In 1983, there was one mining operation in the Fourth of July Creek study area. This was a small placer mine operation with estimated expenditures of about $8,700. When applied to the 15 percent figure that will remain in the local economy, this operation is expected to add about $1,300 in expenditures to the local economies.

Three mining operations were ongoing in the Woodchopper/Coal/Sam Creek study area in 1983. One operation on Coal Creek had as many as seven people working at one time and is considered to be a medium sized operation according to the ADCED study. The smaller operations are estimated to have spent $8,700 and the medium sized operation about $216,000. When applied to the estimate of 15 percent that will remain in the local economy, the total dollar amount that is estimated to have been spent in the local economies from mining activities in the Woodchopper/Coal/Sam Creek study area is approximately $35,000.

For the entire preserve a total of just over $36,000 is estimated to have been spent in the local economies by mining operations that operated within the preserve.

It is also possible to estimate the total impact on the local and state economy beyond the direct expenditures. The initial round of spending is the direct impact on the economy, and the following rounds of spending and employment that are generated by that spending are the indirect impacts. The ADCED study included an input-output analysis which shows the interrelationships among industries in an economy, allowing estimation of the indirect effects of spending by individual industries.

The statewide multiplier of 2.01 represents the total dollar sales in the economy due to each dollar that placer miners spend in Alaska. It is assumed that this multiplier would hold true for estimating all rounds of spending in the local economies as well, and application of this multiplier to our estimates of dollar expenditures in the local economies would result in approximately $73,000 total spending in the communities around Yukon-Charley. By applying the total dollar amount of expenditures from the four mining operations (not just the 15 percent to the local economies) to the multiplier of 2.01, the four operations are expected to have generated approximately $245,000 in total spending.

Value Estimates of Mining Claims

In Yukon-Charley, the gross value estimate of the patented mining claims is $1,500,000 to $2,000,000. The gross value estimate of the unpatented mining claims is $2,000,000 to $3,500,000. The total gross value estimate for mining claims is $3,500,000 to $5,500,000. For more information on the gross value estimates, refer to appendix 8.

NPS Mineral Management Administration

The NPS Alaska Mineral program activities include plan of operation review and analysis, environmental compliance, validity examinations, surveying, data collection, and field monitoring and enforcement. The annual budget for this program was approximately $1,700,000 in 1987. Approximately 20 to 25 people were employed at the regional office and the various park units to perform these activities. See appendix 10 for a detailed description of the major activities of the mineral management program.

PALEONTOLOGICAL RESOURCES

Protecting paleontological history was among the reasons for establishing the Yukon-Charley Rivers National Preserve in 1980 (ANILCA [PL 96-487] Sec. 201[10]). Paleontologic resources in the Yukon-Charley Rivers area are considered scientifically important because of the wide variety of fossils and deposits concentrated in a relatively small geographic area, completeness of depositional record, and the persistent presence of fossils.

When large-scale gold-mining operations were initiated in the Fairbanks district in 1928, extensive fossil collecting was undertaken there and elsewhere in Alaska by the late Otto W. Geist and other collectors on behalf of the American Museum of Natural History. More recently, Geist and others collected vertebrate fossils from the Fairbanks area and Northern Alaska for the Museum of the University of Alaska. Most of the Alaskan vertebrate material, now in museums, has no known stratigraphic context. Detailed studies of Quaternary stratigraphy did not commence in Alaska until the late 1940s, so that even when bones were collected in-situ in the early years, conclusions could not be drawn concerning the age of the enclosing matrix. Therefore, the stratigraphic context of fossils located within Yukon-Charley Rivers National Preserve and the two study areas is of utmost importance to Quaternary paleontology.

Nonmarine, Late Cretaceous/Tertiary sedimentary rocks and unconsolidated Quaternary deposits in the preserve underlie or abut all placer mining areas. They are of scientific interest for their potential to contain data on the evolution and extinction of plants and animals at two critical times in earth history. The Late Cretaceous/Tertiary boundary marks the demise of the dinosaurs along with a third of the earth's other species of plants and animals. The Pliestocene/Holocene boundary marks the end of many large mammals from the most recent Ice Age.

The Late Cretaceous rocks in the preserve are dominantly conglomerate, but include sandstone, mudstone, shale, and coal beds. Pollen and plant fossils from these latter beds are clues to environmental conditions. These strata hold a potential to contain tracks, teeth or skeletal remains of Late Cretaceous animals.

The mined valleys of the preserve were part of a small, ice-free area that existed during the Quaternary Period of geologic history. Remains of ice-age plants and animals are buried in the stratified sediments remaining from that time. The undisturbed deposits are likely important, because they can contain time intervals of data not known from other regions of Alaska.

Intensive paleontologic surveys have not been conducted in the two study areas'; however some fossils have been found. Wood exposed near the base of a 50-foot high gravel embankment in upper Fourth of July Creek, upstream from past mined areas, yielded a radiocarbon age greater than 40,000 years. Downstream from the mined area, a molar from a baby woolly mammoth (*Mammuthus primigenius*) was found within the stream channel in 1986. A steppe bison (*Bison priscus*) skull was discovered in Sam Creek. A molar and tusk of a young woolly mammoth were exposed by placer mining in Ben Creek. A Dall sheep (*Ovis dalli*) fossil skull from an unreported location was also found.

ENVIRONMENTAL CONSEQUENCES

INTRODUCTION

The following section presents qualitative, quantitative, site-specific, and cumulative environmental impacts which result from implementing each of the four alternatives.

For purposes of analysis in this EIS, a probable mineral development scenario was prepared in order to project future mining impacts which would occur under each alternative. This scenario projects the type, extent, and location of mining activity over a 10-year period. The scenario was developed by the National Park Service in consultation with geologists and mineral experts from other government agencies and with representatives of the Alaska mining community.

Target resources were selected for impact analysis from major issues identified in the scoping process and from interpretation of legislative mandates, regulatory authorities, and NPS policies. These target resources may be cumulatively impacted by mining, either directly or indirectly.

The extent of the Woodchopper/Coal/Sam Creek and Fourth of July Creek study areas is based on the locations of major past and probable future mining activity in the preserve. Central to the delineation of the study areas was a consideration of both natural geographic features in the vicinity (such as watershed boundaries) and the probable extent of mining influence on the various target resources (see affected environment section and appendix 2).

Under alternatives B and C, the National Park Service proposes the establishment of resource protection goals to prevent or minimize damage to some target resources from the cumulative effects of mining. The resource protection goal is a percentage of the resource's premining condition that the National Park Service will attempt to maintain or return to in order to protect the resource (appendixes 1, 2, and 5). In the environmental consequences discussion for alternatives B and C, reference is made to the resource protection goal for certain target resources. This will facilitate a comparison of the level of impact resulting from past and future mining under each alternative. In many cases, past impacts from mining have already resulted in areas of habitat that are less than the resource protection goals (RPG) for certain target resources.

All target resources were analyzed in a qualitative manner, and some target resources were analyzed with a quantitative, predictive model called the cumulative impact methodology. Information for the qualitative analyses of past mining impacts was gathered from existing literature sources, as well as from park personnel and other professionals. Information on future mining impacts was obtained from the mineral development scenario, either directly or by derivation. Future impacts were combined with past impacts, i.e. existing conditions, to determine the total cumulative impact under each alternative.

Information for quantitative analyses was derived by first measuring the existing condition of a resource in the study area through field work or interpretation of aerial photographs. Past and future impacts were then modeled with the cumulative impact methodology and the assistance of a computer based geographic information system. These modeling efforts are summarized below and explained in detail in appendix 2.

EVALUATION PROCEDURES FOR SPECIFIC RESOURCES

Resources Evaluated Quantitatively

As a part of the quantitative cumulative impact methodology, environmental variables were identified for each target resource analyzed with the method. Environmental variables are the attributes of target resources used to actually measure impacts on the resource. The selection of environmental variables was based on whether a variable affected the target resource, whether it was measurable, and whether data existed for the variable. The methodology develops procedures which integrate the relationships among the environmental variables of a given target resource.

Target resources selected for quantitative analysis were arctic grayling habitat and riparian wildlife habitat. Table 13 presents all target resources evaluated in this EIS, and the environmental variables for resources analyzed with the cumulative impact methodology.

Table 13. Environmental Variables Used to Evaluate Mining Impacts On Target Resources in the Yukon-Charley Rivers National Preserve, Alaska

Target Resource	Environmental Variable(s)	Established RPG
Wetlands	Riparian corridor vegetation	No
Water quality	Selected water quality and hydrologic parameters	No
Arctic Grayling habitat		Yes
	Water Quality pH Turbidity Heavy metals Macroinvertebrate (aquatic insect) Biomass Hazardous materials Stream Morphometry Fines in substrate Instream cover Percent pools Habitat access Streambank vegetation Sediment Loading Bank stability Upstream erosion Area of disturbance	
Riparian wildlife habitat	Riparian corridor vegetation	Yes
Peregrine Falcon habitat	Riparian corridors, cliffs, bluffs, and qualitative evaluation	No
Visual quality	Undisturbed, natural appearing landscape	No
Cultural resources	Evaluated qualitatively	No
Subsistence use of resources	Evaluated qualitatively	No
Wilderness values	Evaluated qualitatively	No
Recreation	Evaluated qualitatively	No
Local economy	Evaluated qualitatively	No
Paleontological resources	Evaluated qualitatively	No

The methodology centers on the development and use of evaluation procedures which integrate the relationships among environmental variables. The quantitative result from the methodology is the basis for determining the cumulative mining impact on a target resource. These specific evaluation procedures are summarized below. For a complete discussion of evaluation procedures for target resources, see appendix 2.

Fish Resources

The assessment of mining impacts on fish resources was based on changes in quality and quantity of arctic grayling habitat. To measure habitat a Habitat Suitability Index (HSI) model for arctic grayling was developed based on the Habitat Evaluation Procedures (HEP) of the U.S. Fish and Wildlife Service (1980, 1981). This model incorporates available biological, chemical, and physical information to indicate the health of the stream ecosystem in the two Yukon-Charley study areas.

HEP is a standardized methodology for estimating environmental impacts on habitat for selected species of fish and wildlife. This method measures habitat quality for selected evaluation species with an index, the Habitat Suitability Index (HSI). This value is derived from an evaluation of the ability of key habitat components to supply life requisites for selected species. HSI values are obtained for individual species through use of documented habitat suitability models employing measurable key environmental variables. The HSI values are multiplied by area (acres) of available habitat to obtain Habitat Units (HUs) for individual species. Habitat units serve as the principal units of comparison integrating both quality and quantity of habitat. The identified changes in habitat quality and quantity (HUs) provide the basis for comparing alternatives for the evaluation species selected.

The Yukon-Charley HSI model was based on the species/habitat relationships of arctic grayling. This species was chosen because it is a good representative of the stream ecosystem (Karr et al. 1986). It is important to sport and subsistence fishing in the preserve. Information is available on grayling habitat requirements, and stream habitat data are available for the two study areas. The U.S. Fish and Wildlife Service (1985) has published an HSI model for arctic grayling that summarizes life history and habitat requirements. This model was modified for local conditions and for available habitat data (see appendix 2).

The arctic grayling habitat model was divided into three components; each was subdivided into its representative environmental variables (table 13). These components and environmental variables were evaluated because they can be potentially altered by mining activities and are important to the well-being of all arctic grayling life stages. The relationships of these three components and their environmental variables are explained in appendix 2.

Arctic grayling stream habitat was measured in habitat units for each of the study area streams using a combination of field, aerial photography, and map data (see appendix 2). Premining grayling habitat in streams within and downstream of existing disturbance was also estimated. The total premining grayling habitat in each study area was then compared to that which would exist after mining disturbance, as indicated by the mineral development scenario, under each alternative. These values were then compared to resource protection goals for alternatives B and C (see appendix 1).

Both long- and short-term effects of mining on grayling habitat were evaluated. Long-term effects are reductions in premining habitat units caused by stream habitat alterations due to mining excluding the effects of active mining. Long-term impacts are considered major if less than 90 percent of the premining habitat remains after mining activities cease. Short-term effects are reductions in premining habitat units caused by stream habitat alterations due to mining including the effects of active mining. Short-term effects are associated with temporary increases in stream sediment, turbidity, and habitat obstruction caused by active mining. Short-term impacts are considered major if less than 90 percent of the premining habitat is available at any given time.

Surface disturbing activities and toxic material contamination caused by placer mining can reduce the productive capabilities of a stream. The major placer mining impacts on stream ecosystems are associated with (1) loss of riparian vegetation, (2) modification of stream morphometry, (3) exposure of subsurface mineralized soils and rock, (4) accelerated erosion and sediment transport, and (5) storage and use of hazardous materials. The cumulative impacts of mining on fish resources include both past mining impacts and the impacts predicted under each alternative. Table 14 presents a summary of potential past and future placer mining impacts on fish resources in Alaskan streams.

Table 14. Typical Past and Potential Impacts of Placer Mining Activities on Fish Resources in Alaskan Streams.

Mining Activities	Physical Environmental Changes Caused by Mining Activities	Immediate Effects on Stream System Caused by Environmental Changes	Impacts on Target Resource Caused by Immediate Effects on Stream System	Effects on Fish Caused by Impacts on Target Resource
Prospecting Drilling[a] Test Pits[a] **Access to Mine Site** Road construction[a] Road maintenance Airstrip construction[a] Airstrip maintenance **Mine Site Preparation** Barren Gravel Removal Ditching Diversion dam construction Overburden stripping Settling basin construction Stream diversion Support camp construction Thawing of frozen ground **Mine Site Operation** Bucketline dredge operation[a] Chemical processing Hydraulic operation[a] Loader and backhoe operation Moving material to wash plant Sluicing of material Suction dredge operation **Hazardous Material Storage and Use** Fuel and oil Mercury Nitric acid Pesticides Solvents	Accidental chemical, fuel, or oil contamination Change in substrate compaction Change topography Direct input of soil, sand, and gravel into the stream system Direct stream channel modification Increased depth of permafrost table Removal of vegetative cover Water diversion	**Effects on Instream Flow** Increased stream velocity Change in discharge Change in ground/surface water relationships Loss of intergravel water flow Loss of surface flow Transport of hazardous material **Effects on Channel Morphometry** Change in meander pattern Increased gradient Increased average width Increased floodplain icing (Aufeis) Increased ice jamming Reduced average depth Reduced stream length Increased stream braiding **Effects on Sediment Transport** Change in bedload movement Change in sediment transport capacity Increased mobility of substrate Increased erosion Increased sediment from nonpoint and point sources **Effects on Stream Channel Substrate** Change in substrate composition, texture, and compactness Deposition of fines on riffle areas Increased scouring Increased substrate embeddedness **Effects on Streambank Vegetation** Reduced nutrient input Reduced instream cover material Reduced shade	**Impacts on Resting and Feeding Habitat** Blocked access to habitat Creation of tailing pond rearing habitat Reduced cobble and boulder cover Reduced habitat diversity Reduced instream cover Reduced overhanging vegetative cover Reduced pool area **Impacts on Fish Food Organisms** Change in invertebrate species composition Increased invertebrate drift Increased susceptibility to predation Loss of benthic habitat Reduced invertebrate abundance, biomass, and diversity Reduced algae and macrophytes Reduced photosynthetic activity Reduced terrestrial insect biomass Smothering of benthic organisms **Impacts on Water Quality** Decreased dissolved oxygen Depressed pH Exposure to hazardous materials Change in color Increased metal concentrations Increased organic concentration Increased turbidity Increased water temperature Increased solids Synergistic effects **Impacts on Spawning Habitat** Increased fines in spawning gravel Reduced intergravel dissolved oxygen and nutrients Reduced intergravel flow Scouring of spawning gravels	**Effects on Eggs and Fry** Decreased egg and fry survival Smothering of eggs and fry Trapping and crushing of eggs and fry **Effects on Adults, Juveniles, and Fry** Avoidance of spawning and feeding areas Displacement Gill damage Physiological stress Reduced feeding efficiency Reduced survival **Effects on Fish Community** Change in age class structure Change in species composition Loss of genetic information Reduced or eliminated populations

Sources: ADEC 1986; ADF&G 1985a, 1985b, 1986, 1987; Alexander and Hansen 1986; Binns 1978; Bjerklie and LaPerriere 1985; Cordone and Kelly 1961; Eiserman 1978; Emmett 1988; FWPCA 1969; Harvey 1986; Laperriere et al. 1985; Lloyd 1987; Lloyd et al. 1987; Madison 1981; Oswood et al. 1985; Reynolds et al. (in press); Sumner and Smith 1940; USFWS 1980a; USFS 1981; UA 1983; Van Nieuwenhuyse and La Perriere 1986; Wagner and Laperriere 1985; Zemansky et al. 1976.

[a] Past mining activity only

Wildlife Resources

Data on the quantity and quality of wildlife habitat in the preserve is extremely limited, and appropriate HEP models or HSI curves do not exist. Therefore, the impacts of mining on wildlife resources were based only on changes in the quantity of wildlife habitat. To apply the cumulative impact methodology to wildlife resources, the riparian wildlife habitat - defined as the stream corridors and adjacent riparian vegetation - was measured in each of the study area watersheds with aerial photography. Premining riparian habitat in disturbed areas was also estimated. The total premining riparian wildlife habitat in each study area was then compared to that which would exist after mining disturbance, as indicated by the mineral development scenario, under each alternative. These values were then compared to resource protection goals for alternatives B and C.

Reductions in the total acreage of premining habitat due to vegetative disturbance are considered long-term effects. Long-term impacts are considered major if less than 99 percent of the premining habitat remains after mining disturbance (see appendix 1).

The duration of long-term impacts on riparian wildlife habitat (the loss of vegetation and soil) cannot be accurately predicted because of the number of variables inherent with placer mining. Past studies have estimated a minimum of 20 to over 100 years were required for disturbed areas to reach premining levels of wildlife use when single species (e.g. moose) or groups of species (e.g. birds, small mammals) were considered (Singleton et al. 1978; Kertel 1984 and citations within). However, the overall premining productivity, species diversity, and nutrient cycling regimes could be altered for a much longer period, perhaps even thousands of years.

Temporary, short-term effects on wildlife habitat were analyzed by measuring the effective loss of habitat in a zone of wildlife avoidance (due to disturbance) around active mining sites. This zone extends 1/2 mile up and down the riparian corridor from the presumed mining operations. The habitat in these areas is still intact, but it is considered unavailable for use. This effective habitat loss, resulting from mining activity under each alternative, is added to losses from past vegetative disturbance to compute short-term impacts--the total amount of habitat which is unavailable at any given time. Short-term impacts are considered major if less that 90 percent of the premining habitat is available at any given time (see appendix 1).

The cumulative impacts of mining on wildlife resources include both past mining impacts and the impacts predicted under each alternative. In some cases, the mining activities that resulted in past impacts are different from those that would result in future impacts. However, the end result and the primary impact on wildlife resources are usually the same: the long- and short-term loss of the vegetation that comprises wildlife habitat. The loss of habitat, which provides food, water, and cover and space for animals, can result in many adverse effects on individuals and populations. Other effects of mining on wildlife that do not result in direct habitat loss, such as defense of life and property kills (bears) and the use of toxic substances, can also have detrimental effects (table 15).

Resources Evaluated Qualitatively

Target resources selected for qualitative analysis were wetlands, water quality, peregrine falcon prey habitat, visual quality, cultural resources, subsistence use of resources, recreation and visitor use, wilderness values, local economy, and paleontological resources. For these resources, a more descriptive type of cumulative analysis was used to assess and compare mining impacts among alternatives. Like the cumulative impact methodology, the qualitative cumulative impact analysis examines both past and future mining impacts.

The resource attributes chosen for cumulative impact evaluation varied widely from resource to resource. Resource attributes were selected which best describe the characteristics of the particular resource and because the attribute was, to some extent, measurable.

For these resources, past impacts, and thus existing conditions, were determined by using available data and information from existing publications, park personnel, and other professionals. Future impacts were determined by using the mineral development scenario as a model from which to predict resource changes caused by mining. Future impacts resulting from each alternative are added to the past impacts, if any, for the total cumulative impact to the particular resource.

Table 15. Typical Past and Potential Impacts of Placer Mining Activities on Wildlife Resources in Alaska

Mining Activities	Immediate Effect	Impacts on Target Resource	Effects on Wildlife
Overburden stripping Ditching Diversion dam construction Settling pond construction Stream Diversion Test pits/drilling Airstrip construction * Road construction	→ Removal of vegetation and topsoil ↓	Long-term loss of habitat →	Change in community/social structure Reduced numbers Den/nest abandonment Reduced reproductive success or potential Decreased survival Shifts in distribution Reduced feeding efficiency Change in activity patterns Increased intraspecific competition Interference with migrations/ local movements/ immigration and emigration Decreased availability of foodsource Home range abandonment and desertion of traditionally used areas Overutilization of adjacent habitat Increased vulnerability to predation Behavior alterations Adverse physiological effects Increased numbers***
	Loss of organic material Thawing of permafrost Loss of soils development Change in flood regime Erosion Change in veg. community	↑	
Support camp construction Suction dredge Steam thawing of permafrost * Wash plant operation Bucketline dredge operation * Hydraulics * Hard rock mining operation Heavy equipment operation Other human activities: Housing Generator operation Access: Aircraft All-terrain vehicle Other vehicles Secondary effects: Increased recreation Increased poaching	→ Local wildlife displacement –	Short-term loss of habitat →	
Bear-Human conflicts** →	Defense of life and property kills	→	Direct mortality
Toxic chemical storage and use →	Contaminated soil and water	→	Unknown adverse effects

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* Past mining activity only
** As a result of Improper food and garbage storage and other bear encounters
*** For some waterbirds, beaver, and ground squirrels

Selected References:

Singleton et al. 1978	National Park Service 1982
American Fisheries Society 1980	Durst 1984
USFWS 1980	Kertel 1984
	Cross 1985

Unlike the fish and wildlife habitat target resources, resource protection goals were not established for the resources examined qualitatively.

ALTERNATIVE A - NO ACTION

Under alternative A, operations on existing patented and valid unpatented mining claims in the preserve would continue to be subject to the requirements of the NPS minerals management regulations, the access provisions of the Department of the Interior's transportation and utility system regulations, and to other applicable state and federal legislative and regulatory requirements. Determination of site-specific and cumulative effects of individual operations would be made qualitatively. Under alternative A, future disturbance in the study area from the four placer mining operations predicted by the probable mineral development scenario would total 90 acres. Impacts discussed below are based on this high level of mining activity (table 1).

IMPACTS ON WETLANDS

Under alternative A, future vegetative disturbance in the Woodchopper/Coal/Sam Creek study area from the three placer mining operations predicted by the mineral development scenario would total 70 acres. Future vegetative disturbance in the Fourth of July Creek study area from the single placer operation would total 20 acres. Wetland disturbance would include removal of soil and vegetation, increased erosion, disposal of dredge and fill material, and increased drainage of surface water and groundwater. Construction of roads, dams, berms, dikes, drainage ditches, settling basins, and stream diversions, and stockpiling of material could alter water regimes and potentially modify and even destroy wetland areas. Potential degradation from contaminants could occur in the event of a fuel or hazardous material spill. All of the above impacts would be in addition to past impacts. Large amounts of riparian habitat were disrupted during past mining (see riparian wildlife habitat section), and much of the riparian habitat is also considered wetlands by definition. Thus, past mining activities have had a major impact on wetlands in the study areas.

Potential impacts on wetlands caused by the four mining operations would be reduced by requiring protection measures outlined by the NPS floodplain and wetlands management guidelines for implementing Executive Orders 11988 and 11990 (appendixes 12 and 13). The Water Resource Protection Measures and Operating Stipulations for Approved Mining Plans of Operations, outlined in appendix 14, provides additional procedures for reducing impacts on wetlands.

Under this alternative, an undetermined number of unpatented claims could be patented without patent restrictions. The impacts from nonmining developments on patented claims, such as cabins, subdivisions, or commercial lodges, could result in further loss of wetlands.

Future placer mining and nonmining development on both patented and unpatented claims which could place dredged and/or fill materials into wetlands would be subject to section 404 of the Clean Water Act (PL 92-500). The U.S. Army Corps of Engineers regulates disposal of dredge and fill materials in wetland areas (appendix 16).

Cumulative Impacts. The total cumulative impacts to wetlands are composed of both past impacts and impacts predicted under this alternative. Past placer mining has caused major modifications of wetlands in the two study areas. These modifications include removal of vegetation, removal of the organic muck layer, increased permafrost table depth, increased erosion, disposal of dredge and fill material, and increased drainage of surface- and groundwater. Past mining has disturbed 841 acres of riparian vegetation in the Woodchopper/Coal/Sam Creek study area and 56 acres in the Fourth of July Creek study area (see aquatic resources and wildlife resources section). The majority of this disturbance affected wetland plant communities.

Under this alternative, the consequences of mining impacts on wetlands include degraded water quality, and loss of fish and wildlife habitat (see aquatic resources and wildlife resources section).

Conclusion. Past placer mining activities have had a major impact on wetlands in the two study areas. The majority of the impacts involved riparian plant communities (see aquatic resources and wildlife resources sections). Additional placer mining under this alternative would add to and increase the magnitude of existing major impacts. Potential developments associated with the nonmining uses of patented claims would also add to existing impacts. The impacts of mining on wetlands in the two study areas would be the greatest of any of the alternatives.

IMPACTS ON AQUATIC RESOURCES

Under this alternative, the size and type of operations are similar for each of the three placer mining operations predicted by the mineral development scenario; therefore, short-term impacts on water quality and fish habitat caused by each operation are assumed to be similar. The impacts caused by each active operation would have an effect on surface water quality and fish habitat from the mine site downstream to the Yukon River. Impacts on groundwater would occur beneath and surrounding the disturbed area. For each operation the exposure of soils and loss of vegetation would result from stripping of overburden, clearing of yarding and storage sites, heavy equipment access, stockpiling of materials, and construction of roads, dams, berms, drainage ditches, stream diversions, and settling basins. Physical damage to the streams would occur as a result of heavy mining equipment operating within the channel and along the banks of streams. Work within the stream channel could destroy bank stability, straighten channels, increase stream gradient, and alter instream flow patterns. Impacts on surface water and/or groundwater caused by these surface disturbing activities include (1) altered water regimes, (2) elevated metal concentrations, (3) lowered pH, (4) accelerated erosion and transport of sediments, (4) increased turbidity, and/or (5) pollution from accidental spillage of oil, fuel, or other hazardous materials. Impacts on arctic grayling habitat caused by surface disturbing activities include (1) degraded water quality, (2) riparian vegetation loss, (3) increased fine material embedded in the channel substrate, (4) loss of pool and cover area, (5) reduced aquatic insect populations, (6) restricted fish passage, (7) disrupted spawning, rearing, and feeding areas, and (8) reduced instream flows. Diversion of water to settling ponds and washplants could temporarily reduce instream flows. Point source sediment loading and turbidity would occur within regulatory restrictions.

Effects on water quality and fish habitat would continue long after future mining operations cease. These long-term impacts include changes in the natural condition of water chemistry, continued input of eroded material from disturbed areas, reduced stream nutrients from streamside vegetation, and reduced pool and instream cover area. However, mitigation and reclamation measures implemented for each operation could substantially reduce the duration of long-term impacts.

Potential impacts caused by mining operations under this alternative would be reduced by meeting state and federal water quality standards and criteria, maintaining natural stream flows, and implementing the water resource protection measures and operating stipulations summarized in appendix 14.

Under this alternative, an undetermined number of unpatented claims could be patented without patent restrictions. The impacts from nonmining developments on patented claims, such as cabins, subdivisions, or commercial lodges, could result in further degradation of water quality and grayling habitat. Additional impacts on water quality and fish habitat could be caused by increased erosion, sediment transport, and sewage associated with the operation of the facilities.

Future placer mining and nonmining development activities on both patented and unpatented claims which could place dredged and/or fill materials into study areas waters would be subject to section 404 of the Clean Water Act (PL 92-500). The U.S. Army Corps of Engineers regulates all disposal of dredge and fill materials in preserve waters (appendix 16).

Possible nonmining impacts inside the study areas include the concentration of visitor use along mining access roads and trails. Because of the lack of other overland travel routes, visitors are likely to use mining roads, most of which follow areas from the Yukon River inland. Additional impacts on water quality and fish habitat from this type of use would be minimal.

Water Quality

Woodchopper/Coal/Sam Creek Study Area. Under alternative A, land cover disturbance in the study area from the three placer mining operations predicted by the mineral development scenario would total 70 acres within the stream and riparian corridor. The three operations would affect surface water quality in a total of 31.3 streams miles. Impacts on ground and surface water could reduce the productive capabilities of aquatic and terrestrial organisms in the study area.

Woodchopper Creek - Placer mining has affected water quality in 12.2 miles of stream from the upper end of the disturbed areas downstream to the Yukon River. Dissolved oxygen, pH, alkalinity, hardness, and metal levels (except zinc) of water within and downstream of previously mined areas are within both the EPA (1986) criteria for protection of aquatic life and the drinking water standards for the state of Alaska. Zinc is naturally high in Woodchopper Creek. Petroleum products and other hazardous materials are present in the watershed. However, no measurable evidence of stream contamination from these materials was found during the 1986 water quality and fishery survey. Past surface disturbing activities adjacent to Woodchopper, Mineral, and Iron creeks have accelerated stream and riparian corridor erosion and sediment transport.

The single placer mining operation predicted by the mineral development scenario would impact surface water quality in approximately 11.3 miles of stream. Future mining would potentially modify 5.8 miles of stream channel and bank within the claims area and disturb 30 acres of soil and vegetation adjacent to the stream. Surface disturbing activities would affect water quality within the claims area and downstream to the Yukon River.

Coal Creek - Placer mining has affected water quality in 8.7 miles of stream from the upper end of the disturbed areas downstream to the Yukon River. Dissolved oxygen, pH, alkalinity, hardness, and metal levels (except zinc) of water within and downstream of previously mined areas are within both the EPA (1986) criteria for protection of aquatic life and the drinking water standards for the state of Alaska. Zinc is naturally high in Coal Creek. Petroleum products and other hazardous materials are present in the watershed. Soil contaminated with mercury exists within 100 feet of Beaton Pup, a small tributary of Coal Creek. However, four Beaton Pup water samples collected and analyzed in 1986 showed no detectable concentrations of total recoverable mercury at the 0.0002mg/l detectable limit. During the 1986 water quality survey, no measurable evidence of stream contamination from other abandoned materials was found. Past surface disturbance adjacent to Coal Creek has elevated sediment and associated metal input from nonpoint runoff during storms and high flows.

Future mining in the Coal Creek drainage will be limited to mining claims on Boulder Creek. The single placer mining operation predicted by the mineral development scenario would impact surface water quality in approximately 6.2 miles of stream. In Boulder Creek, future mining would potentially modify less than 0.8 miles of stream channel and bank within the claims area and disturb 20 acres of soil and vegetation adjacent to the stream. Surface disturbing activities would affect water quality within the claims area and downstream to the Yukon River.

Sam and Ben Creeks - The majority of past mining activities in the Sam Creek drainage have been concentrated in the Ben Creek area. Placer mining has affected water quality in 9.5 miles of stream from the upper end of the disturbed areas downstream to the Yukon River. Dissolved oxygen, pH, alkalinity, hardness, and metal levels (except zinc) of water within and downstream of previously mined areas are within both the EPA (1986) criteria for the protection of aquatic life and the drinking water standards for the state of Alaska. Zinc is naturally high in Ben and Sam creeks. Petroleum products and other hazardous materials are present in the watershed. However, no measurable evidence of stream contamination from these materials was found during the 1986 survey. Past surface disturbance adjacent to Ben Creek and several road crossings have elevated sediment and associated metal input from nonpoint runoff during storms and high flows.

The single placer mining operation predicted by the mineral development scenario would impact surface water quality in approximately 13.8 miles of stream in Sam and Ben creeks. These impacts would be in addition to past impacts. Future mining would potentially modify 7.7 miles of stream channel and bank within the claims area and disturb 20 acres of soil and vegetation adjacent to the stream. Surface disturbance would affect water quality within the claims area and downstream to the Yukon River.

Cumulative Impacts - The total cumulative impacts to water quality are composed of both past impacts and impacts predicted under this alternative. Past placer mining operations have caused major modifications of the original stream channel and adjacent terrain, thus altering the chemical and physical characteristics of water draining the study area. These modifications include removal of vegetation, removal of the organic muck layer, increased exposure of subsurface rock and soil with high mineral content, and increased erosion. Past placer mining disturbance increased the depth of the permafrost table under 1,116 acres resulting in altered surface and groundwater regimes. Past mining has affected water quality within and downstream of the disturbed area in 30.4 miles of stream. The combined effects of both past impacts and impacts predicted under this alternative would affect 34.7 miles of stream within and downstream of disturbance. Long-term impacts on water quality would be associated with the continued input of sediment into streams from nonpoint runoff of disturbed areas during storms and high flows.

Conclusion - Past mining activities have had an impact on existing water quality. These impacts have not caused the natural levels of various water quality parameters to fall outside the acceptable limits for both the protection of aquatic life (EPA 1986) and the state of Alaska drinking water standards. Under this alternative, predicted mining would further impact water quality. However, the three operations predicted under this alternative would be required to comply with all state and federal water regulations and NPS water protection requirements. Potential developments associated with the nonmining uses of patented claims would have additional impacts on water quality. The cumulative impacts of past placer mining and impacts under this alternative would be minor.

Fourth of July Creek Study Area. Under alternative A, land cover disturbance in the study area from the single placer mining operations predicted by the mineral development scenario would total 20 acres within the stream corridor. The single operations would affect water quality in a total of 13.1 streams miles. Impacts on groundwater and surface water could reduce the productive capabilities of aquatic and terrestrial organisms in the study area.

Fourth of July Creek - Dissolved oxygen, pH, alkalinity, hardness, and metal levels (except zinc) of water within a reach starting one mile downstream of previously mined area and continuing downstream to the Yukon River are within the drinking water standards for Alaska. Zinc is naturally high in Fourth of July Creek. The pH and alkalinity levels within and upstream of the previously mined area are low and not within the EPA (1986) recommended criteria for protection of aquatic life. The pH and alkalinity of stream water near the mining claims is naturally low. However, rock exposed by past mining activities has a high pyrite concentration, and it may have extended the range of low pH waters downstream. Petroleum products and other hazardous materials are present in the watershed, but the 1986 water quality and fishery survey found no measurable evidence of stream contamination from these materials. Past surface disturbance adjacent to Fourth of July Creek has accelerated watershed erosion which caused increased levels of sediment and associated metals in the stream.

The single placer mining operation predicted by the mineral development scenario would impact surface water quality in approximately 13.1 miles of stream. Future mining would potentially modify 2.1 miles of stream channel and bank within the claims area and disturb 20 acres of soil and vegetation adjacent to the stream. Surface disturbance would affect stream water quality within the mining claims area and downstream 11.0 miles below the claims area.

Cumulative Impacts - The total cumulative impacts to water quality are composed of both past impacts and impacts predicted under this alternative. Placer mining operations have caused major modifications of the original stream channel and adjacent terrain, thus altering the chemical and physical characteristics of water draining the study area. These modifications include removal of vegetation, removal of the organic muck layer, increased exposure of subsurface rock and soil with high mineral content, and increased erosion. The combined effects of past mining and mining under this alternative would impact 13.1 miles of stream in the study area. Long-term impacts on water quality would be associated with the continued input of sediment into streams from nonpoint runoff of disturbed areas during major storms and high flows.

Conclusion - Past mining activities have had an impact on existing water quality. These impacts have not caused the natural levels of various water quality parameters to fall outside the acceptable limits for both the protection of aquatic life (EPA 1986) and the state of Alaska drinking water standards. Under this alternative, predicted mining would further impact water quality. However, the single operation predicted under this alternative would be required to comply with all state and federal water regulations and NPS water protection requirements. Potential developments associated with the nonmining uses of patented claims would have additional impacts on water quality. The cumulative impacts of past placer mining and impacts under this alternative would be minor.

Arctic Grayling Habitat

Woodchopper/Coal/Sam Creek Study Area. Under alternative A, future placer mining in the study area during the 10 year active-mining period would reduce the suitability of stream habitat for all arctic grayling life stages. The three placer mining operations predicted by the mineral development scenario would cause a short-term grayling habitat loss of 7.3 HUS. After mining activities cease, the long-term loss of habitat would be 2.3 HUs. Within the claims areas, future mining would potentially disturb a total of 14.3 stream miles of fish habitat with a wetted area of 25.7 acres. An additional 17.0 miles of stream habitat with a wetted area of 70.9 acres downstream of the mining claims would also be affected.

Woodchopper Creek - Arctic grayling stream habitat has been severely impacted by mining operations during the past 85 years. Placer mining has channelized and rerouted 2.9 miles of stream. Existing impacts on the mined reach include a loss of 3.8 acres of stream, reduced pool area, reduced instream cover area, reduced streambank vegetation, 126 acres of riparian vegetation disturbance, increased stream velocity, and elevated sediment and associated metal input from nonpoint sources during storms and high flows.

The 5.1 miles (20.5 acres of stream habitat), downstream of the existing disturbance has been impacted to a lesser degree. Impacts on downstream habitat are attributed to the additional sediment from the upstream disturbance and loss of upstream nutrients from streamside vegetation.

There is no grayling habitat in Mineral and Iron creeks. The lower reaches of these two streams were mined in the past causing increased channel and streamside erosion and loss of riparian vegetation. The additional sediment from these creeks flows into Woodchopper Creek causing a further reduction in habitat quality.

The single placer mining operation predicted by the mineral development scenario would impact approximately 6.6 acres of grayling habitat in Woodchopper Creek within the claims area. An additional 22.7 stream acres downstream would be impacted. Future operations could further degrade the already damaged habitat. Predicted impacts under the scenario could include stream channel modifications; reduced or eliminated pool and cover habitat; loss of approximately 30 acres of riparian vegetation along Mineral, Iron, and Woodchopper creeks; degraded water quality; and contamination from accidental spillage of oil, fuel, or other hazardous materials.

Coal Creek - Arctic grayling habitat has been severely impacted by past mining operations in the Coal Creek drainage. Past mining has channelized or rerouted 7.6 miles of stream habitat and disturbed an estimated 705 acres of riparian vegetation. Specific impacts on the mined reach compared to upstream reaches included a loss of 14.7 acres of stream habitat, reduced pool area, reduced instream cover area, reduced streambank vegetation cover, increased stream velocity, and elevated sediment and associated metal input from nonpoint sources during storms and high flows.

The 1.1 miles (7.6 acres of stream habitat) downstream of the existing disturbance has also been impacted. Impacts on downstream habitat are associated with increased sediment transport through the reach. Deposition of additional sediments below the mined reaches has resulted in increased fines embedded in the bottom substrate, increased bank erosion, increased stream width, reduced abundance and quality of pools and cover, and loss of upstream nutrients from streamside vegetation.

Future mining in the Coal Creek drainage will be limited to mining claims lying on Boulder Creek. Boulder Creek, a small tributary, drains into the heavily damaged reaches of Coal Creek. Limited mining activities in the past have disturbed a small area of riparian vegetation. Boulder Creek has very little fishery value.

The single placer mining operation predicted by the mineral development scenario would impact less than 0.9 acres of grayling habitat within the Boulder Creek claims area. An additional 22.9 stream acres on Coal Creek from the Boulder Creek confluence to the Yukon River would be impacted. Future mining could further degrade the already heavily damaged stream habitat in Coal Creek. Predicted impacts under the scenario could include stream channel modifications; reduced pool and cover habitat; loss of approximately 20 acres of riparian vegetation along Boulder Creek; degraded water quality; and potential contamination from accidental spillage of oil, fuel and other hazardous materials.

Sam and Ben Creeks - The majority of past mining activities in the Sam Creek drainage have been concentrated on Ben Creek. Existing impacts in the Sam Creek drainage are minor in comparison with the other two mined drainages in the study area. A total 0.1 acres of stream habitat have been impacted in Ben Creek. There are 26.3 acres of habitat on Sam Creek downstream of Ben Creek which has been impacted by mining. Specific impacts in the Ben Creek drainage include several road crossings and 10 acres of disturbance adjacent to the stream. In Sam Creek, there is no measurable channel modification or riparian vegetation disturbance. Existing impacts on grayling habitat may be attributed to elevated sediment and associated metal input from nonpoint runoff of disturbed areas during storms and high flows.

The single placer mining operation predicted by the mineral development scenario would impact approximately 6.2 acres of grayling habitat in Ben and Sam creeks. An additional or 22.9 acres of habitat downstream of the mining claims would be impacted. Predicted impacts under the scenario could include stream channel modifications; reduced pool and cover habitat; loss of approximately 20 acres of riparian vegetation along Ben and Sam creeks; degraded water quality; and potential contamination from accidental spillage of oil, fuel, or other hazardous materials.

Cumulative Impacts - The total cumulative long-term impacts to arctic grayling habitat are composed of both past impacts and impacts predicted under this alternative. Woodchopper, Coal, and Sam creeks provided an estimated 151.0 arctic grayling habitat units before mining. Placer mining operations have caused major modifications of the original stream channel and adjacent terrain, and have substantially altered the stream habitat characteristics within and downstream of the mined area. These alterations have reduced the study area arctic grayling habitat total to 117.1 HUs, or 77.5 percent of the premining total (table 16). This loss of arctic grayling habitat to past mining represents a major impact. Under this alternative, 2.3 additional HUs would be lost. Combined with past stream habitat loss (33.9 HUs) the total long-term loss of arctic grayling habitat in the study area would be 36.2 HUs, or 24.0 percent of the pre-mining total (table 16). The cumulative, short-term habitat loss that would occur during active mining would reduce grayling habitat by 41.2 HUs, or 27.3 percent of the premining total (table 16). Thus, the habitat available during active mining would equal 72.7 percent of the premining total.

Under this alternative, the consequences of the long- and short-term reductions in arctic grayling habitat include reduced survival, avoidance of spawning and feeding areas, displacement of fish, change in age class structure, and reduced or eliminated fish populations both downstream and upstream of the mine site.

Conclusion - Past mining activities have had a major impact on arctic grayling habitat. Under this alternative, predicted mining would further reduce arctic grayling habitat by 2.3 HUs. When impacts from this alternative are added to the past impact, further mining would have a major cumulative impact on arctic grayling habitat. The cumulative, long-term loss of habitat would equal 36.2 HUs. Major short-term impacts would also occur, with a total of 7.3 HUs of arctic grayling habitat lost during mining. Potential developments associated with the nonmining uses of patented claims would have additional long-term effects on arctic grayling habitat and the fish that feed on it.

Fourth of July Creek Study Area. Under alternative A, placer mining during the 10 year active-mining period would further reduce the suitability of stream habitat for all grayling life stages. The single placer mining operation predicted by the mineral development scenario would cause a short-term grayling habitat loss of an additional 3.0 HUs. After mining activities cease, the long-term loss of habitat would be 0.9 HUs. Within the claims area, future mining would potentially disturb a total of 2.1 stream miles of fish habitat with a wetted area of 4.3 acres. An additional 11.0 miles of stream habitat with a wetted area of 30.4 acres downstream of the mining claims would be affected.

Fourth of July Creek - Approximately 2.1 miles of existing grayling habitat has been impacted by mining in the Fourth of July Creek drainage. Specific impacts on the mined reaches include reduced pool area, reduced instream cover area, reduced streambank vegetation, 56 acres of riparian disturbance, and elevated sediment and associated metal input from nonpoint sources during storms and high flows.

The 11.0 miles (30.4 acres of stream habitat) downstream of the existing disturbance, has been impacted to a lesser degree. Impacts on downstream habitat are associated with increased sediment transport through the reach.

Table 16. Arctic Grayling Habitat Loss Under Alternative A in the Yukon-Charley Rivers National Preserve

	HABITAT (HUs)		LONG-TERM IMPACTS (HABITAT UNITS)			SHORT-TERM IMPACTS (HUs)	
Study Area Drainage	Pre-Mining	Existing (% premining)	Past Mining Loss	Alternative A Loss	Cumulative Loss	Alternative A Loss	Cumulative Loss
Woodchopper	45.1	36.0 (79.8)	9.1	.0	9.1	1.5	10.6
Coal	66.7	42.0 (63.0)	24.7	.1	24.8	.5	25.2
Sam	39.2	39.1 (99.7)	.1	2.2	2.3	5.3	5.4
Total	151.0	117.1 (77.5)	33.9	2.3	36.2	7.3	41.2
Fourth of July	32.3	29.2 (90.4)	3.1	.9	4.0	3.0	6.1
Grand Total	183.3	146.3 (79.8)	37.0	3.2	40.2	10.3	47.3

The single placer mining operation predicted by the mineral development scenario would impact 4.3 acres of grayling habitat in Fourth of July Creek within the claims area. An additional 30.4 stream acres downstream would be impacted. The single operation could further degrade the already damaged habitat. Predicted impacts under the scenario could include stream channel modifications; reduced pool and cover habitat; loss of approximately 20 acres of riparian vegetation; degraded water quality; and contamination from accidental spillage of oil, fuel, or other hazardous materials.

Cumulative Impacts - The cumulative long-term impacts to arctic grayling habitat are composed of both past impacts and impacts predicted under this alternative. Fourth of July Creek provided an estimated 32.3 arctic grayling habitat units before mining. Placer mining operations have caused substantial modifications of the original stream channel and adjacent terrain, and have altered the stream habitat characteristics within and downstream of the mined area. These alterations have reduced the study area arctic grayling habitat total to 29.2 HUs, or 90.1 percent of the premining total (table 16). This loss of arctic grayling habitat to past mining does not represent a major impact. Under this alternative an additional 0.9 HUs would be lost after all mining predicted by the mineral development scenario is completed. Combined with past stream habitat loss (3.1 HUs) the total long-term loss of arctic grayling habitat in the study area would be 4.0 HUs, or 12.0 percent of the premining total (table 16). The cumulative, short-term habitat loss that would occur during active mining would reduce grayling habitat by an additional 3.0 HUs, for a total of 18.9 percent of the premining total (table 16). Thus, the habitat available during active mining would equal 81.1 percent of the premining total.

Under this alternative, the consequences of the long- and short-term reductions in arctic grayling habitat include reduced survival, avoidance of spawning and feeding areas, displacement of fish, change in age class structure, and reduced or eliminated fish populations both downstream and upstream of the mine site.

Conclusion - Past mining activities have had a minor impact on arctic grayling habitat. Under this alternative, predicted mining would further reduce arctic grayling habitat by 0.9 HUs. When added to the past impact, further mining would have a major cumulative impact on arctic grayling habitat. The cumulative long-term loss of habitat would equal 4.0 HUs. Major short-term impacts would also occur, with a total of 3.0 HUs of arctic grayling habitat lost during mining. Potential developments associated with the nonmining uses of patented claims would have additional impacts on grayling habitat.

Summary. Under this alternative, the impacts on arctic grayling habitat in two combined study areas would be the greatest of any of the alternatives. The cumulative loss of arctic grayling habitat in the four study area streams would equal 40.2 HUs. The cumulative short-term loss grayling habitat in the four study area streams would equal 47.3 HUs during future mining activities (table 16). In addition, an undetermined number of mining claims could go to patents. There would be no patent restrictions; required reclamation would be minimal resulting in extended durations of long-term impacts; and the potential for nonmining developments on patented claims, which would create additional impacts on the resource, would be high.

IMPACTS ON WILDLIFE RESOURCES

Short-term habitat loss would occur when animals are displaced from or avoid areas surrounding active mining operations. Vehicle noise, human activity, and other disturbance caused by transporting personnel and equipment to and from mine sites within the study area would result in additional short-term habitat reductions along access routes between the claims groups, the Yukon River, and airstrips in Woodchopper Creek, Coal Creek, Fourth of July Creek, and in the hills between Coal Creek and Sam Creek. Additional long-term habitat loss would be prevented by operators using existing routes or low-impact, all terrain vehicles. Heavy equipment would be moved in the winter across frozen, snow-covered terrain.

Under this alternative, an undetermined number of unpatented claims could be patented without patent restrictions. The impacts from possible nonmining developments on patented claims, such as cabins, subdivisions, or commercial lodges, could result in further permanent loss of habitat. Depending on the location and extent of developments, the construction and occupation of facilities could result in (1) further long-term loss of habitat, (2) further unavailability of habitat due to disturbance, and (3) a greater potential for defense of life and property (DLP) bear mortality.

Possible nonmining impacts inside the study area include the concentration of visitor use along mining access roads and trails. Because of the lack of other overland travel routes, visitors are likely to use mining roads, most of which follow riparian areas from the Yukon River inland. This use would not result in long-term habitat reductions however. Some sporadic, short-term reductions in available habitat near roads and trails would result due to disturbance.

Possible future impacts on habitat outside the study area include disturbance due to increased visitor use, new tour boat operators, or new, commercial lodges along the Yukon River.

Riparian Wildlife Habitat

Woodchopper/Coal/Sam Creek Study Area. Under alternative A, future vegetative disturbance in the study area from the three placer mining operations predicted by the mineral development scenario would total 70 acres. Each of these operations would occur in riparian corridors. Therefore, the disturbance of vegetation would reduce riparian wildlife habitat by 70 acres. Additional, short-term habitat losses would occur when animals are displaced from or avoid areas surrounding active mining operations. Assuming that all three mining operations were working simultaneously, short-term habitat losses would reduce the amount of available riparian wildlife habitat by an additional 51 acres.

Cumulative Impacts - The total cumulative impacts to riparian wildlife habitat are composed of both past impacts and impacts predicted under this alternative. A total of 4,466 acres of riparian wildlife habitat was present in the study area (145,943 acres) before mining. Vegetative disturbance from past mining activity has disturbed 841 acres (18.8 percent) of this habitat (table 17), reducing the study area total to 3,625 acres, or 81.2 percent of the premining total. This loss of habitat to past mining represents a major impact. Under this alterative, 70 additional acres of habitat would be lost. Combined with past mining disturbance (841 acres) the total, long-term loss of riparian wildlife habitat in the study area would be 911 acres, or 20.4 percent of the premining total (table 17). The zone of avoidance around active mining operations would result in an effective, short-term loss of 51 additional acres, and reduce available habitat by a total of 962 acres, or 21.5 percent of the premining total (table 17). Thus, the habitat available during mining would equal 78.5 percent of the premining total.

Bears, especially black bears, are known to frequent riparian habitats and adjacent uplands in the study area. Defense of life and property (DLP) bear mortality can occur when human-bear conflicts arise. Under this alternative, the potential for DLP bear mortality would be moderate for black bears and low for grizzly bears. To help reduce the potential for DLP kills, miners would be required to store food and garbage in ways that do not attract bears.

The primary, life-sustaining resources for many species of wildlife are provided by riparian wildlife habitat. Riparian areas constitute important habitat components for black bears, moose, and many small mammals and birds. Many of these are important prey species for wolves. Under this alternative, possible consequences of the long- and short-term reductions of riparian wildlife habitat include lower species diversity, reduced numbers of individual species, shifts in species distributions through den or nest abandonment, reduced reproductive success, decreased survival, overuse of adjacent habitat, and increased competition (table 15).

Conclusion - Past mining activities have had a major, long-term impact on riparian wildlife habitat. Future mining activity under alternative A would reduce existing riparian wildlife habitat by 70 acres. When added to the past impact, further mining would have a major, cumulative impact on riparian wildlife habitat. The cumulative long-term loss would equal 911 acres. Major short-term impacts would also occur, with a maximum of 962 acres of riparian wildlife habitat unavailable during mining activities. Potential developments associated with the nonmining uses of patented claims would have additional long-term effects on riparian habitat and the animals that use it. A potential for DLP bear kills would exist.

Fourth of July Creek Study Area. Under alternative A, future vegetative disturbance in the study area from the single placer mining operation predicted by the mineral development scenario would total 20 acres. The mining would occur in a riparian corridor, and the riparian wildlife habitat in the study area would be reduced by 20 acres. Additional short-term habitat losses would occur when animals are displaced from or avoid areas surrounding the active mining operation. These losses would reduce the amount of available riparian wildlife habitat by an additional 16 acres (table 17).

Cumulative Impacts - The total cumulative impacts to riparian wildlife habitat are composed of both past impacts and impacts predicted under this alternative. A total of 833 acres of riparian wildlife habitat was present in the study area (30,598 acres) before mining. Vegetative disturbance from past mining activity has disturbed 56 acres (6.7 percent) of this habitat (table 17), reducing the study area total to 777 acres, or 93.3 percent of the premining total. This loss of habitat to past mining represents a major impact. Under this alternative, 20 additional acres of habitat would be lost. Combined with past mining disturbance (56 acres) the total loss of riparian wildlife habitat in the study area would be 76 acres, or 9.1 percent of the premining total (table 17). The zone of avoidance around active mining operations would result in an effective, short-term loss of 16 additional acres, and reduces available habitat by a total of 92 acres, or 11 percent of the premining total (table 17). Thus, the available habitat would equal 89 percent of the premining total.

Bears, especially black bears, are known to frequent riparian habitats and adjacent areas in the study area. Defense of life and property (DLP) bear mortality can occur when human-bear conflicts arise. Under this alternative, the potential for DLP bear mortality would be moderate for black bears and low for grizzly bears. To help reduce the potential for DLP kills, miners would be required to store food and garbage in ways that do not attract bears.

The primary, life-sustaining resources for many species of wildlife are provided by riparian wildlife habitat. Riparian areas constitute important habitat components for black bears, moose, and many small mammals and birds. Many of these are important prey species for wolves. Under this alternative, possible consequences of the long- and short-term reductions of riparian wildlife habitat include lower species diversity, reduced numbers of individual species, and shifts in species distributions through den or nest abandonment, reduced reproductive success, decreased survival, overuse of adjacent habitat, and increased competition (table 15).

Conclusion - Past mining activities have had a major impact on riparian wildlife habitat. Under this alternative, predicted mining would further reduce riparian wildlife habitat by 20 acres. When added to the past impact, further mining would have a major cumulative impact on riparian wildlife habitat. The cumulative, long-term loss of habitat would equal 76 acres. Major short-term impacts would also occur, with a total of 92 acres of riparian wildlife habitat unavailable during mining. Potential developments associated with the nonmining uses of patented claims would have additional long-term effects on riparian habitat and the animals that use it. A potential for DLP bear kills would exist.

Summary. Under this alternative, the impacts of mining on riparian wildlife habitat in the two study areas combined would be the greatest of any of the alternatives. A cumulative, long-term loss of 987 acres of habitat would occur. The cumulative, short-term loss of habitat would equal 1,054 acres during mining activities (table 17). In addition, an undetermined number of mining claims could go to patent without patent restrictions; required reclamation would be minimal resulting in extended durations of long-term impacts, and the potential for nonmining developments on patented claims, which would create additional impacts on the resource, would be high.

Table 17. Riparian Wildlife Habitat Loss Under Alternative A in the Yukon-Charley Rivers National Preserve, Alaska

	HABITAT (ACRES)		LONG-TERM IMPACTS (ACRES)			SHORT-TERM IMPACTS (ACRES)	
Study Area Drainage	Pre-Mining	Existing (% premining)	Past Mining Loss	Alternative A Loss	Cumulative Loss	Alternative A Loss	Cumulative Loss
Woodchopper	1,227	1,101 (89.7)	126	30	156	26	182
Coal	2,081	1,376 (66.1)	705	20	725	14	739
Sam	1,158	1,148 (99.1)	10	20	30	11	41
Total	4,466	3,625 (81.2)	841	70	911	51	962
Fourth of July	833	777 (93.3)	56	20	76	16	92
Grand Total	5,299	4,402 (83.1)	897	90	987	67	1,054

IMPACTS ON THREATENED AND ENDANGERED SPECIES

Peregrine Falcon Prey Habitat

General impacts discussed under impacts on wildlife resources also pertain to peregrine falcons. All riparian wildlife habitat within a 10 mile radius of a peregrine falcon eyrie is considered peregrine falcon prey habitat. Ten miles is considered an average, maximum foraging distance for peregrines in the preserve (Ambrose, pers.

comm.), and seven of the eight prey species most consistently selected by peregrines in the preserve primarily or exclusively inhabit riparian areas (Hunter 1987).

Woodchopper/Coal/Sam Creek Study Area. Vegetative disturbance from past mining activity has disturbed 841 acres of peregrine falcon prey habitat in the study area. Because of the lack of detailed habitat use information on peregrine falcons in the preserve, the total amount of peregrine falcon prey habitat in the study area is unknown.

Impacts on peregrine falcon prey habitat specific to alternative A include long- and short-term losses of primarily low quality habitat. Under alternative A, future vegetative disturbance in the study area from the 3 placer mining operations predicted by the mineral development scenario would total 70 acres. Each of these operations would occur in riparian corridors. Therefore, the disturbance of vegetation during mining under this alternative would reduce peregrine falcon prey habitat in the study area by 70 acres. Because of disturbance, additional short-term habitat losses would occur when birds are displaced from or avoid areas surrounding active mining operations. Assuming that all three mining operations were working simultaneously, short-term habitat losses would reduce the amount of available peregrine falcon prey habitat by an additional 51 acres (table 18).

Six known peregrine falcon eyries on the Yukon River are located within a probable foraging distance (10 miles) to the claims areas. Three eyries would be affected by operations on the Ben Creek claims, four by operations on the Sam Creek claims, and five operations on the Coal (Boulder Creek) and Woodchopper claims.

Cumulative Impacts - The total cumulative impacts to peregrine falcon prey habitat are composed of both past mining impacts and impacts predicted under this alternative. Past mining activities have reduced peregrine falcon prey habitat by 841 acres. The vegetative disturbance that would occur as a result of future mining activities (70 acres), combined with past mining disturbance, would reduce peregrine falcon prey habitat in the study area by 911 acres. During active mining, additional short-term habitat loss would render a total of 962 acres unavailable (table 18).

The peregrine falcon prey habitat represented by the riparian corridors in the study area is considered low quality prey habitat except where the streams enter the Yukon River valley (Ambrose, pers. comm.). Although definitive studies documenting peregrine falcon habitat use in Yukon-Charley have not been conducted, studies in other areas have shown that more than 50 percent of all foraging flights of peregrine falcons were within 3 km (1.9 mi.) of their eyries (Ambrose, pers. comm., Beebe 1974, Bird and Aubry 1982, Enderson and Kirven 1983). Further, most foraging flights of peregrines in the area are believed to occur along the Yukon River corridor where the majority of prime prey habitat is located (Ambrose, pers. comm.).

Conclusion - The reductions in peregrine falcon prey habitat that would occur under this alternative would slightly reduce foraging opportunities for peregrine falcons nesting at six eyries located on the Yukon River. The impacts would not be major.

Fourth of July Creek Study Area. Because of the lack of detailed habitat-use information on peregrine falcons in the preserve, the total amount of peregrine falcon prey habitat in the Fourth of July Creek study area is unknown. However, the majority of their prey inhabit riparian areas (Hunter 1987), and thus riparian habitat that is within 10 miles of a peregrine falcon eyrie is considered peregrine falcon prey habitat. Vegetative disturbance from past mining activity has disturbed 56 acres of peregrine falcon prey habitat in this study area.

Impacts on peregrine falcon prey habitat specific to alternative A include long- and short-term losses of primarily low quality habitat. Under alternative A, future vegetative disturbance in the study area from the single placer mining operation predicted by the mineral development scenario would total 20 acres. The mining would occur in a riparian corridor, and thus 20 acres of peregrine falcon prey habitat would be disturbed. Additional short-term habitat losses would occur when, because of disturbance, birds are displaced from or avoid areas surrounding active mining operations. These short-term habitat losses would reduce the amount of available peregrine falcon prey habitat by an additional 16 acres (table 18).

Three known peregrine falcon eyries located on the Yukon River are within a probable foraging distance (10 miles) to the mining claims and would be affected by associated habitat disturbance.

Cumulative Impacts - The total cumulative impacts to peregrine falcon prey habitat are composed of both past mining impacts and impacts predicted under this alternative. Past mining activities have reduced peregrine falcon prey habitat by 56 acres. The vegetative disturbance that would occur as a result of future mining activities (20 acres), combined with past mining disturbance, would reduce peregrine falcon prey habitat in the study area by 76 acres. During active mining, additional short-term habitat loss would render a total of 92 acres unavailable (table 18).

The peregrine falcon prey habitat represented by the riparian corridors in the study area is considered low quality prey habitat except where the streams enter the Yukon River valley (Ambrose, pers. comm.). Although definitive studies documenting peregrine falcon habitat use in Yukon Charley have not been conducted, studies in other areas have shown that more than 50 percent of all foraging flights of peregrine falcons were within 3 km (1.9 mi.) of their eyries (Ambrose, pers. comm., Beebe 1974; Bird and Aubry 1982; Enderson and Kirven, 1983). Further, most foraging flights of peregrines in the area are believed to occur along the Yukon River corridor where the majority of prime prey habitat is located (Ambrose, pers. comm.).

Conclusion - The areas of primary habitat disturbance that would occur under this alternative would be 7 or more miles from the three closest peregrine falcon eyries, each of which are on the Yukon River. The reductions in peregrine falcon prey habitat may slightly reduce foraging opportunities for peregrine falcons nesting at these three eyries. The impacts would not be major.

Summary of Two Study Areas. Under this alternative, the impacts of mining on peregrine falcon prey habitat in the two study areas combined would be the greatest of any of the alternatives. A cumulative, long-term loss of 987 acres of low quality habitat would occur. The cumulative, short-term loss of habitat would equal 1,054 acres (table 18). In addition, an undetermined number of mining claims could go to patent without patent restrictions, less stringent reclamation requirements on patented claims could result in extended durations of long-term impacts, and the potential for nonmining developments on patented claims, which would create additional impacts on the resource, would be high.

Table 18. Peregrine Falcon Prey Habitat Loss Under Alternative A in the Yukon-Charley Rivers National Preserve, Alaska

	LONG-TERM IMPACTS (ACRES)			SHORT-TERM IMPACTS (ACRES)	
Study Area Drainage	Past Mining Loss	Alternative A Loss	Cumulative Loss	Alternative A Loss	Cumulative Loss
Woodchopper	126	30	156	26	182
Coal	705	20	725	14	739
Sam	10	20	30	11	41
Total	841	70	911	51	962
Fourth of July	56	20	76	16	92
Grand Total	897	90	987	67	1,054

IMPACTS ON VISUAL QUALITY

Woodchopper/Coal/Sam Creek Study Area Since little or no disturbance occurred before mining, the entire 145,943 acres in the study area was considered to be in a pristine, naturally appearing condition prior to any mining disturbance. Past mining activity has altered the appearance of 1,116 acres in the study area, reducing the amount of natural appearing landscape by 0.76 percent (table 19).

Areas that have been altered by past mining are noticeably different than the surrounding landscape. The appearance of disturbed areas ranges from completely barren landscapes composed of unvegetated dredge-spoil piles to areas that have been revegetated to various degrees, mostly in vegetative compositions that contrast with the surrounding natural environment.

Cumulative Impacts - The impacts from past and future mining on visual quality are long-term impacts. Under this alternative, 70 acres of new disturbance would occur. Combined with past disturbance (1,116 acres), the total, long-term impact on visual quality would be 1,186 acres, or 0.80 percent of the study area total (table 19). Thus, 99.2 percent of the study area landscape would remain in a naturally appearing condition.

Under this alternative, an undetermined number of unpatented claims could be patented without patent restrictions. Claims that are patented without patent restrictions are open to development for nonmining purposes. The disturbance from possible future nonmining developments on patented claims, such as cabins, subdivisions, or commercial lodges, would add to the cumulative impacts from mining disturbance.

The only disturbance that is readily visible from the Yukon River, the primary recreational corridor, is at the mouth of Coal Creek. Here, a cabin, a barge unloading site, and some revegetated tailing areas can be seen. The mined areas' greatest scenic impacts are probably realized from the air by passengers in small planes flying over the area.

Conclusion - The reductions in visual quality that would occur under this alternative from past and future vegetative disturbance would not have a major long-term effect on the preserve. However, although the potential for major nonmining developments on patented claims in the future seems low at this point, any future developments that do occur would cumulatively add to the long-term impacts on visual quality.

Fourth of July Creek Study Area Past mining activity has altered a total of 80 acres in this study area (30,598 acres) reducing the amount of natural appearing landscape by 0.26 percent (table 19). Areas that have been impacted by past mining are noticeably different than the surrounding landscape. The appearance of disturbed areas ranges from completely barren landscapes composed of unvegetated dredge-spoil piles to areas that have been revegetated to various degrees, mostly in vegetative compositions that contrast with the surrounding natural environment.

Cumulative Impacts - The impacts of past and future mining on visual quality are long-term impacts. Under this alternative, 20 acres of new disturbance would occur. Combined with past disturbance (80 acres), the total disturbed acreage representing a long-term impact on visual quality would be 100 acres, or 0.33 percent of the total study area acreage (table 19). Thus, 99.67 percent of the study area landscape would remain in a naturally appearing condition.

Under this alternative, an undetermined number of unpatented claims could be patented without patent restrictions. Mining claims that are patented without patent restrictions are open to development for nonmining purposes. The impacts from possible future nonmining developments on patented claims, such as cabins, subdivisions, or commercial lodges, would add to the impacts of vegetatively disturbed areas.

The majority of current preserve visitors are not affected by the mining-caused landscape disturbance in the Fourth of July Creek watershed. Most of the disturbance lies 5 or more miles from the Yukon River and is out of view. The mined areas' greatest scenic impacts are probably realized from the air by passengers in small planes flying over the area.

Conclusion - The reductions in visual quality that would occur under this alternative from past and future vegetative disturbance would not have a major long-term effect on the preserve. However, although the potential for major, nonmining developments on patented claims in the future seems low at this point, any future developments would cumulatively add to the long-term impacts on visual quality. Depending on the location and extent of development, these impacts could become major.

Summary. Under this alternative, the impacts of mining on visual quality in the two study areas combined would be the greatest of any of the alternatives. A cumulative, long-term, natural landscape disturbance of 1,286 acres of would occur (table 19). In addition, an undetermined number of mining claims could go to patent, there would be no patent restrictions on patented claims, reclamation requirements would be less stringent for patented claims which could result in extended durations of long-term impacts, and the potential for nonmining developments on patented claims, which would create additional impacts on the resource, would be high.

Table 19. Impacts of Alternatives A on Visual Quality in the Yukon-Charley Rivers National Preserve, Alaska

	UNDISTURBED LANDSCAPE		LONG-TERM IMPACTS (ACRES)			
Study Area Drainage	Pre-Mining	Existing (% premining)	Past Mining Loss	Alternative Loss	Cumulative Loss	Percent Loss
Woodchopper	47,025	46,899	337	30	367	.72
Coal	53,574	52,869	769	20	789	1.47
Sam	45,344	45,334	10	20	30	.07
Total	145,943	145,102	1,116	70	1,186	.81
Fourth of July	30,598	30,542	80	20	100	.33
Grand Total	176,541	175,644	1,196	90	1,286	.73

IMPACTS ON CULTURAL RESOURCES

The majority of the historic properties documented in the study areas of Yukon-Charley Rivers National Preserve are associated with early placer mining operations. Comprising a wide and diverse array of site types, they include: habitation sites consisting of roadhouses, single or multiple cabins and structural remains which are associated with historic features; engineering/mining technology sites including examples of drift and open cut mining methods, water diversion systems, dams, ditches, flumes and pipelines; and early mining equipment remains such as hydraulic nozzles, wagons, and draglines. The locations, size and configurations of these historic sites vary considerably from small, isolated pieces of equipment, to large extensive flume or ditch systems extending through many mining claims.

Prehistoric sites in the study areas of the preserve are generally lithic scatters, often associated with cultural features, and are generally situated near creek confluences.

When mining occurs, there is the possibility of impacts to those cultural resources situated on or near mining claims. Potential impacts to prehistoric and historic resources associated with mining development and production are detailed in table 20.

It is not possible, without a specific mining plan of operations that details the extent of proposed mining activities, to assess the extent of the impacts to any specific cultural resources. The National Park Service, under the provisions of a Programmatic Agreement (see appendix 7) with the Advisory Council on Historic Preservation (ACHP) and the Alaska State Historic Preservation Officer, will fulfill its legal obligation to satisfy section 106 of the National Historic Preservation Act (PL 89-665) by evaluating each plan of operations submitted on a case-by-case basis.

During the permitting process the National Park Service will attempt to assure that there will be no adverse effects to the historic properties. If it is determined that there will be unavoidable impacts to eligible historic properties, the National Park Service will consult with the Alaska State Historic Preservation Office to develop a mitigation plan for those impacts.

Conclusion. Under this alternative, the National Park Service will protect cultural resources through the process outlined in the Programmatic Agreement with the Alaska State Historic Preservation Officer and ACHP (appendix 7).

IMPACTS ON SUBSISTENCE USE OF RESOURCES/ SECTION 810 EVALUATION

The overall pattern of subsistence resources use in the region of Yukon-Charley Rivers National Preserve is given in the affected environment section.

The drainage basins of the two study areas contain suitable habitat for two animals harvested by local rural residents--moose and arctic grayling. The natural habitats are not robust or extensive enough to support high densities of these animals. The natural populations, however, were depended upon for subsistence when the only local rural residents were the early miners in these canyons. The later mining companies, like today's claimants, did not rely on local subsistence resources.

Arctic grayling have been affected by past mining and could be affected by resumed mining. Mining affects the water quality, sediment loading, and channel morphometry of the creeks and thereby reduces the grayling population (aquatic resources section). However, because grayling play only a small part in the regional subsistence pattern, especially from the mined drainages, reduced populations would not affect the take by local rural residents.

Mining over the short term destroys moose habitat. Although the long-term effects of mining on moose habitat are not fully understood, this analysis assumes that mining disturbs and displaces moose (see wildlife resources section).

Hunting by boat is the usual means in which local rural residents pursue moose. Moose frequent the mining creeks as they do many other riverine environments in the Yukon-Charley area. Yet these creeks are not major spots to seek moose. There are many much more accessible areas by boat along the Yukon, Kandik, and Nation rivers that the local residents recognize as good moose habitats.

A minor amount of fur trapping has been done along some of the mining drainages. Resumed mining would displace furbearers to a minor degree through habitat loss. Fur trapping is a winter activity, when mining is not being done. Therefore, impacts are not expected on this subsistence activity.

Both species of bear are wide ranging, and the highly localized mining disturbances would be minor in terms of hunting for bears as a subsistence resource. The human activities associated with mining could lead to increased bear/people contacts. A few bears may be shot and killed in defense of life and property that would not be without the human presence (see wildlife resources section).

Table 20. Potential Effects of Mining on Cultural Resources

Mining

excavation (overburden removal, drilling, blasting)
access roads
material source borrow areas
water diversion channels
staging areas
camps and storage

Effect

obliteration of all or part of a site through:
exposure of a buried site
strata disruption
changes in artifact condition
destruction of artifacts
alterations in erosional patterns
loss of context of materials, artifacts, etc.
destruction of historic structures and objects

Human Activity

Effect:

increased potential for discovery and disturbance
looting of sites
trampling
vehicular disturbance--direct and indirect (vibration, etc.)
site covering through dumping of trash, tailings, overburden
animal damage due to attraction of human camps

Emergency

environmental cleanup procedures due to flooding, fire, fuel spills, etc.

Effect:

disturbance or contamination of sites and artifacts

Reclamation Procedures

stabilization
revegetation
recontouring
water quality measures
settling ponds
filtration plants

Effects:

If undisturbed areas are involved, the effects listed under mining apply.

The Coal Creek area is within a former spring and fall migration route of the Fortymile caribou herd. Impacts on the subsistence use of caribou by local rural residents are not anticipated from resumed mining. This is because migration does not occur in the mining season and because caribou no longer migrate through the area.

Although resumed mining would destroy some grayling, moose, and furbearer habitats and could possibly lead to a slight reduction in the number of black and brown bears in the area, minor impacts are foreseen on the local rural resident use of resources for subsistence purposes. The overall regional subsistence pattern would not be affected because very little subsistence harvest occurs along the mining drainages. Any population reductions in fish or wildlife would not be of a magnitude to affect the local rural resident take of any species. All of the claim groups can be adequately reached under existing conditions and no additional access is expected under this alternative. These access routes to the mining claims are not used by local rural residents seeking subsistence resources.

Subsistence uses are the priority consumptive uses on the public lands of Alaska and are given preference on such lands over other consumptive uses (ANILCA, PL 96-487, section 802[2]). Also, the National Park Service works with the Alaska Department of Fish and Game to protect the continued viability of all wild renewable resources in the preserve (ANILCA, PL 96-487, section 802[3]). Implementation of these two provisions of ANILCA (PL 96-487) should mitigate any loss of subsistence resources to local rural residents caused by renewed mining activity. See appendix 11 for a complete evaluation of subsistence activities in the preserve (ANILCA, PL 96-487, section 810).

In summary, chiefly because the regional subsistence pattern indicates scant use of the mining-claim areas, resumed mining at its maximum possible level under alternative A would have little impact on the subsistence uses of resources. There would essentially be no change from existing conditions.

Conclusion. There would be no major impacts on the subsistence uses of resources under alternative A.

IMPACTS ON WILDERNESS VALUES

Under alternative A, future mining activities and land disturbance from the four placer mining operations predicted by the mineral development scenario would impact the wilderness values of portions of the Woodchopper/Coal/Sam Creek and Fourth of July Creek study areas. Each operation, under this alternative, would use integrated washing and recovery plants supported by bulldozers, front-end loaders, and backhoes. Settling pond systems would be used and streams would be occasionally diverted during the course of operations. Necessary support facilities, generators, and other equipment would also be included in these placer operations and would also effect wilderness values.

Wilderness values, such as solitude and opportunities for primitive and unconfined recreation on mining claims and lands adjacent to these mining activities within the study areas would continue to be affected due to the sights and sounds of mining and mining related activities and traffic.

Cumulative Impact. The total cumulative impacts to wilderness values are composed of both past impacts and future impacts predicted under this alternative. According to the proposed alternative in the FEIS for Wilderness Recommendation (NPS 1988), both the Woodchopper/Coal/Sam Creek and the Fourth of July Creek study areas would not be designated as wilderness due to existing development, tailings piles, mining claims, as well as the numerous mining trails in the area. Under alternative A, the potential disturbance that would occur as a result of any future mining activities, together with private inholdings and the potential for other land uses, would continue to impact wilderness values of major portions of the two study areas. Wilderness values of portions of the two study areas could be expected to remain impacted as long as active mining occurs and surface disturbances are evident.

In the long term, it is possible that some of the less disturbed portions of the study area would regain their wilderness values. The most heavily disturbed portions of the study area would not regain their wilderness values until evidence of human activity has been removed and the study area is reclaimed or allowed to return to its natural state which would not occur in the foreseeable future.

Under this alternative, an undetermined number of unpatented claims could be patented without patent restrictions. The potential for nonmining developments such as cabin sites and commercial lodges on these and existing patented mining claims would be high, which would reinforce the study area's non-wilderness character. Mining claims patented without patent restrictions would also have less restrictive reclamation standards applied to mining activities. This would result in longer site-recovery periods and an extended duration of long-term effects to wilderness values.

Conclusion Past mining activities have had an impact on wilderness values in portions of the Woodchopper/Coal/Sam Creek and the Fourth of July Creek study areas. Under this alternative, predicted mining disturbance and mining related activities would further reduce wilderness values in portions of the study areas. Inholdings, mining claims, and access roads in the study areas would also continue to affect wilderness values in portions of the two study areas. Existing and potential developments associated with nonmining land uses on patented claims could have additional effects on wilderness values.

IMPACTS ON RECREATION AND VISITOR USE

Under alternative A, the number of recreational participants in the Woodchopper/Coal/Sam Creek and the Fourth of July Creek study areas would be virtually unchanged from as it existed in the years prior to 1985. The four mining operations that are anticipated to occur under this alternative, according to the mineral development scenario, would have only limited impacts on recreational use in the two study areas.

Although impacts to the number of visitors would be limited, the quality of many recreational pursuits in the preserve could be affected by the mining activities. Hunting, sightseeing, hiking and camping are among the recreational pursuits that would be affected by mining activities. Mining activities would generally reduce the quality of scenic views and vistas, diminish wilderness values, and disrupt opportunities for solitude. Surface disturbances and the loss of vegetation that would be caused by the mining activities would affect the area's natural setting and diminish the appreciation of the area by recreational participants. Aesthetic, natural qualities and recreation would be impacted by the presence of heavy machinery, vehicles, trailers, housing, equipment, and supplies in the vicinity of mining camps. While mining operations are ongoing, generators, pumps, and other heavy equipment would disrupt solitude and the appreciation of being in a natural environment. Noise from these mining operations would tend to diminish opportunities for viewing and hunting wildlife that tend to avoid areas where operations are ongoing. Vehicle noise, human activity, and other disturbances caused by transporting personnel and equipment to and from mine sites would affect aesthetic qualities, solitude, as well as disturbing the natural habitat. In addition, some of the anticipated mining activities could pose as safety hazards to visitors in the storage and use of fuels and equipment.

More specifically, the mining operations would disrupt approximately 90 acres in the two study areas combined and would degrade scenic qualities by the removal of vegetation, stream channelization and sedimentation, and the presence of equipment and temporary structures. Diminished wildlife habitat in the vicinity of mining operations and the tendency for wildlife to avoid mining operations would consequently reduce hunting and wildlife viewing opportunities in the area.

On the other hand, the continuation of placer mining activities that would occur under this alternative would allow visitors, with permission of the owners, to continue to observe active placer mining in the study areas. Observation of active and past mining operations is thought to be a growing recreational use in the preserve and, in fact, interpretation of the bygone eras of the Yukon Gold Rush was one of the reasons for establishing the preserve (ANILCA, PL 96-487, 201[10]).

In the long term, the number of visitors to the Woodchopper/Coal/Sam Creek and the Fourth of July Creek study areas would be unaffected and would continue to gradually increase due to the expected increase in recreational use of the preserve. Recreational quality would gradually increase as the effects of these mining operations become less apparent.

Under this alternative, an undetermined number of unpatented mining claims could become patented without restrictions. The potential for nonmining developments on these and existing patented mining claims such as land subdivision for cabin sites, lodges, or campgrounds would be high under this alternative which has no provisions to limit nonmining development on patented claims. Potential impacts to recreation associated with these nonmining developments would include increased pressure on the recreational resources of the region due to increased visitor use, the introduction of new recreational pursuits. Degradation of the quality of recreational opportunities would occur for some due to increased surface disturbance. Claims patented without patent restrictions would also have less restrictive reclamation standards applied to mined areas; this would result in longer site-recovery periods and an extended duration of long-term effects on the quality of many recreational uses.

Cumulative Impact The total cumulative impact on recreational use and quality results from adding the past impacts and the future impacts that are predicted under this alternative. Recreational use in the preserve and the two study areas is relatively light. Under alternative A, visitor use of the study area would not change from the gradually increasing trends that currently exist; therefore, mining does not have cumulative impact on the number of recreational participants in the two study areas.

The quality of recreation has been slightly affected by minor surface disturbances associated with past mining operations such as the removal of overburden, the formation of settling ponds, and the loss of vegetation which have affected the area's natural setting. The quality of most recreational pursuits are additionally impacted under the conditions of this alternative. Hunting, backpacking, and aerial sightseeing would be slightly impacted by the four mining operations due to surface disturbances, visual and aural effects, and increased human activity.

Conclusion The number of recreational participants in the two study areas would continue to be limited due to overall limited preserve usage. The levels of human activity in the study area, caused by the four mining operations and the 90 acres that would be disturbed, would not have a major impact on visitor use levels in the two study areas because of the very limited recreational use that occurs there. In addition, implementing this alternative and the resulting mining activity would have only slight impacts on the quality of recreational opportunities in the two study areas.

IMPACTS ON LOCAL ECONOMY

Under alternative A, three placer mining operation would occur in the Woodchopper/Coal/Sam Creek study area and a single operation would occur in the Fourth of July Creek study area. All of these operations would be small operations, employing between one to four people, and would have sufficient reserves to operate every year over the life of the ten year mineral development scenario. Average annual employment in the two study areas under this alternative would be approximately four to sixteen people.

To estimate the amount of expenditures from these mining operations that may occur in the local communities, a 1986 publication of the Alaska Department of Commerce and Economic Development titled The Role of Placer Mining in the Alaska Economy - 1985 (ADCED 1986) is utilized in this analysis. Medium operations are expected to have total mean annual expenditures of about $217,000 and smaller operations of approximately $8,700 to $39,000. Thus, total annual expenditures from these four operations would be approximately $35,000 to $153,000 each year over the time frame of the scenario. The large variation in this range is because one or all of these placer mines could be a one-man operation which spends relatively little for its mining activities. Of this total amount, 15 percent could be expected to be spent in the local communities for such things as fuel, equipment, supplies, and services. In total the four placer operations that are anticipated to occur over the ten year life of the scenario would spend approximately $5,250 to $23,250 annually in the communities in and around Yukon-Charley.

The indirect impact of these mining operations would be the generation of employment opportunities in transportation services, retail sales, manufacturing, mineral processing, and government. The total statewide economic impact produced from these mining operations can be estimated by using an input-output analysis multiplier of 2.01. In other words, for every dollar spent by these mining operations, the ultimate effect of that dollar, including all rounds of spending, can be estimated by multiplying the expenditures by 2.01. So, for the four small mining operations that are expected to occur in the two study areas, the total, statewide impact of the direct expenditures is estimated to be about $70,250 to $307,500.

Economic activity, not related to the anticipated mining operations, would continue to be nonexistent in the two study areas. Under this alternative, however, an undetermined number of unpatented claims could be patented without patent restrictions. The potential for nonmining developments such as land subdivision for cabin sites or wilderness lodges on these and existing patented claims would be high under this alternative. Any such development could have economic impacts on the study areas by providing jobs and economic activity in the local communities.

Cumulative Impact. Past mining activities in the Yukon-Charley River National Preserve have had an effect on the economies of the local communities. In addition to direct employment, expenditures made by the mining operations for such things as equipment, fuel, and supplies have played a limited role in the economy of some of the local communities. In 1983, the last year of major mining in the preserve, there was one small mine in operation in the Fourth of July Creek study area and three mines with 7 to 12 employees in the Woodchopper/Coal/Sam Creek study area. There was very little activity in either of the two study areas in 1984 or 1985, and there has been no mining activity since 1985.

Because impacts of mining on the economies of the local communities are seasonal and dependent on on-going operations, only the impacts of active operations are included in cumulative impacts. The four predicted mining operations would provide 4 to 16 employment opportunities and about $5,250 to $23,250 would be spent in the local communities.

Conclusion. Under this alternative, employment in the two study areas would remain virtually the same as it was in the last year of substantial mining activity (1983). Therefore, there would be only slight beneficial impacts to mining employment. Similarly, the four predicted mining operations would have only limited impacts on direct expenditures that would be spent in the local communities. Potential developments associated with nonmining land uses could have additional beneficial impacts on the economies of the local communities.

Impacts on NPS Mineral Management Program Administration

Management of mining and mineral development activities has increased administrative costs associated with the NPS mineral management program. This program currently employs 20 to 25 people in the NPS Alaska Regional Office, Wrangell-St. Elias and Denali National Park and Preserves. Major mining and mineral management program activities include plan of operations review and analysis, environmental compliance, validity examinations, claim boundary surveying, claim resource data collecting, operation monitoring and enforcement, and reclamation.

Under alternative A, program administration costs would not change due to the potential continuation of mining activities in the two study areas and the NPS reclamation of disturbed areas on acquired mining claims. Reclamation would be a long-term cost associated with the mineral management program.

Conclusion. Administration of the NPS Alaska mineral management program would not be affected by this alternative for the immediate future.

IMPACTS ON PALEONTOLOGICAL RESOURCES

Under alternative A, 70 acres of new disturbance within the Woodchopper/Coal/Sam Creek study area and 20 acres of new disturbance in the Fourth of July Creek study area would occur.

The placers located in Mineral, Iron, Boulder, and Ben Creek drainages are steep and underlain by shallow permafrost. As a consequence, material above bedrock has a slow, but continual, downhill motion and is further churned and mixed by annual freeze and thaw cycles. Having lost its stratigraphic context, contained paleontologic material has almost no scientific value. Therefore mining of these placers would have little or no impact on paleontological resources.

Undisturbed areas within the claims on Woodchopper, Sam, and Fourth of July Creeks cover stratified deposits. Mining of these undisturbed areas could alter deposits containing paleontological material of scientific importance. Impacts in these areas would be avoided by scientifically examining the stratigraphy, age, and fossil content of the section to be mined prior to the approval of a plan of operations.

Cumulative Impacts. The total cumulative impacts to paleontological resources are composed of both past impacts and impacts predicted under this alternative. Past mining activity has disturbed 1,116 acres in the Woodchopper/Coal/Sam Creek study area and 80 acres in the Fourth of July Creek study area. Impacts on paleontologic resources within the disturbed areas include the loss or alteration of stratified deposits and contained paleontologic material. The scientific value of lost or modified deposits is unknown.

Under this alternative, an undetermined number of unpatented claims could be patented without patent restrictions. The impacts from nonmining developments on patented claims, such as cabins, subdivisions, or commercial lodges, could result in further modification of stratified deposits containing paleontological material.

Conclusion. Past mining impacts have caused the loss and alteration of paleontological resources with unknown scientific value. Future loss of important paleontological resources would be avoided through scientific examination of stratified deposits within the claims prior to mining. Potential developments associated with the nonmining uses of patented claims could add to existing impacts. Under this alternative, the potential impacts on paleontological resources in the two study areas would be the greatest of any of the alternatives.

ALTERNATIVE B - PROPOSED ACTION

Under alternative B, operations on existing patented and valid unpatented mining claims in the preserve would be subject to the requirements of the NPS minerals management regulations. The access provisions of the Department of the Interior's transportation and utility system regulations, and to other applicable state and federal legislative and regulatory requirements. Additionally, the evaluation of mining proposals would include a quantitative evaluation of cumulative effects. Impacts discussed below are based on a moderate level of mining activity (table 1).

IMPACTS ON WETLANDS

Under alternative B, the vegetative disturbance that would result from new mining activity would be less than 70 acres in the Woodchopper/Coal/Sam Creek study area and less than 20 acres in the Fourth of July Creek study area. Large amounts of riparian habitat were disrupted during past mining (see riparian wildlife habitat section), and much of the riparian habitat is also considered wetlands by definition. Thus, past mining activities have had a major impact on wetlands in the study areas. Past mining disturbance included removal of soil and vegetation, increased erosion, disposal of dredge and fill material, and increased drainage of surface- and groundwater. In addition, construction of roads, dams, berms, dikes, drainage ditches, settling basins, and stream diversions, and stockpiling of material has altered water regimes and modified or destroyed wetland areas.

The potential for impacts on wetlands from any approved operations would be reduced by requiring protection measures outlined by the floodplain and wetlands management guidelines for implementing Executive Orders 11988 and 11990 (appendixes 12 and 13). The Water Resource Protection Measures and Operating Stipulations for Approved Mining Plans of Operations, outlined in appendix 14, provides additional wetland protection measures.

Under this alternative, an undetermined number of unpatented claims could be patented without patent restrictions. The impacts from nonmining developments on patented claims, such as cabins, subdivisions, or commercial lodges, could result in further loss of wetlands.

Future placer mining and nonmining development on both patented and unpatented claims which would place dredged and/or fill materials into wetlands would be subject to section 404 of the Clean Water Act (PL 92-500). The U.S. Army Corps of Engineers would regulate all future disposal of dredge and fill materials in wetland areas (appendix 16).

Cumulative Impacts. The total cumulative impacts to wetlands are composed of both past impacts and impacts predicted under this alternative. Past placer mining has caused major modifications of wetlands in the two study areas. These modifications include removal of vegetation, removal of the organic muck layer, increased permafrost table depth, increased erosion, disposal of dredge and fill material, and increased drainage of surface water and groundwater. Past mining has disturbed 841 acres of riparian vegetation in the Woodchopper/Coal/Sam Creek study area and 56 acres in the Fourth of July Creek study area (see aquatic resources and wildlife resources sections). The majority of this disturbance affected wetland plant communities.

Under this alternative, the possible consequences of mining impacts on wetlands include degraded water quality, and loss of fish and wildlife habitat (see aquatic resources and wildlife resources sections).

Conclusion. Past mining activities have had a major impact on wetlands in the two study areas. The majority of these impacts involved riparian plant communities (see aquatic and wildlife resources sections). Loss of wetlands that would occur under this alternative would be less than those for alternative A, potentially greater than that for alternative C, and greater than that for alternative D. Potential developments associated with the nonmining uses of patented claims would have an additional impact on wetlands.

IMPACTS ON AQUATIC RESOURCES

Impacts caused by past mining operations on water quality and grayling habitat for Woodchopper, Coal, Sam, and Fourth of July Creeks are described under alternative A. Future impacts of individual operations described under alternative A could potentially be the same for this alternative.

Potential impacts caused by mining operations under this alternative would be reduced by meeting state and federal water quality standards and criteria, maintaining natural stream flows, and implementing the water resource protection measures and operating stipulations summarized in appendix 14.

Under this alternative, an undetermined number of unpatented claims could be patented without patent restrictions. The impacts from nonmining developments on patented claims, such as cabins, subdivisions, or commercial lodges, could result in further degradation of water quality and grayling habitat. Additional impacts on water quality and fish habitat could be caused by increased erosion, sediment transport, and sewage associated with the operation of the facilities.

Future placer mining and nonmining development activities on both patented and unpatented claims which could place dredged and/or fill materials into study area waters would be subject to section 404 of the Clean Water Act (PL 92-500). The U.S. Army Corps of Engineers regulates all disposal of dredge and fill materials in preserve waters (appendix 16).

Possible nonmining impacts inside the study area include the concentration of visitor use along mining access roads and trails. Because of the lack of other overland travel routes, visitors are likely to use mining roads, most of which follow areas from the Yukon River inland. Additional impacts on water quality and fish habitat from this type of use would be minimal.

Water Quality

Woodchopper/Coal/Sam Creek Study Area. Under alternative B, land cover disturbance in the study area that would result from new mining activities would be less than 70 acres. Groundwater and surface water quality would be affected within the disturbed area. New mining activities would affect stream water quality in less than 31.3 miles of stream.

Cumulative Impacts - The total cumulative impacts to water quality are composed of both past impacts and impacts predicted under this alternative. Past placer mining operations have caused major modifications of the original stream channel and adjacent terrain, thus altering the chemical and physical characteristics of water draining the study area. These modifications include removal of vegetation, removal of the organic muck layer, thawing of permafrost, increased exposure of subsurface rock and soil with high mineral content, and increased erosion. Past mining has affected water quality within 1,116 acres of disturbance and in 30.4 miles of stream. Existing disturbance has not caused major changes in the study area stream's natural water quality. Additional impacts from new mining would affect less than 70 acres of land cover and less than 31.3 miles of stream. Potential impacts on surface water and/or groundwater caused by past and new mining activities include: (1) altered water regimes, (2) elevated metal concentrations, (3) lowered pH, (4) accelerated erosion and transport of sediments, (5) increased turbidity, and/or (6) pollution from accidental spillage of oil, fuel, or other hazardous materials. Long-term impacts on water quality would be associated with the continued input of sediment into streams from nonpoint runoff of disturbed areas during storms and high flows. Impacts on groundwater and surface water could reduce the productive capabilities of aquatic and terrestrial organisms in the study area.

Conclusion - Past mining activities have had an impact on existing water quality. These impacts have not caused the natural levels of various water quality parameters to fall outside the acceptable limits for both the protection of aquatic life (EPA 1986) and the state of Alaska drinking water standards. Under this alternative, predicted mining would further impact water quality. However, approved operations would be required to comply with all state and federal water regulations and NPS water protection requirements. Potential developments associated with the nonmining uses of patented claims would have additional impacts on water quality. The cumulative impacts of past placer mining and this alternative would be minor. Under this alternative, the impacts of mining on water quality would be less than those for alternative A, greater than those for alternative D, and potentially greater than those for alternative C.

Fourth of July Creek Study Area. Under alternative B, land cover disturbance in the study area that would result from new mining activities would be less than 20 acres. Groundwater and surface water quality would be affected within the disturbed area. New mining activities would affect stream water quality in less than 13.1 miles of stream.

Cumulative Impacts - The total cumulative impacts to water quality are composed of both past impacts and impacts predicted under this alternative. Past placer mining operations have caused major modifications of the original stream channel and adjacent terrain, thus altering the chemical and physical characteristics of water draining the study area. These modifications include removal of vegetation, removal of the organic muck layer, thawing of permafrost, increased exposure of subsurface rock and soil with high mineral content, and increased erosion. Past mining has affected water quality within 80 acres of disturbance and in 13.1 miles of stream. Existing disturbance has not caused major changes in the study area stream's natural water quality. Additional impacts from new mining would affect less than 20 acres of land cover and less than 13.1 miles of stream. Potential impacts on surface water and/or groundwater caused by past and new mining activities include: (1) altered water regimes, (2) elevated metal concentrations, (3) lowered pH, (4) accelerated erosion and transport of sediments, (5) increased turbidity, and/or (6) pollution from accidental spillage of oil, fuel, or other hazardous materials. Long-term impacts on water quality would be associated with the continued input of sediment into streams from nonpoint runoff of disturbed areas during storms and high flows. Impacts on ground and surface water could reduce the productive capabilities of aquatic and terrestrial organisms in the study area.

Conclusion - Past mining activities have had an impact on existing water quality. These impacts have not caused the natural levels of various water quality parameters to fall outside the acceptable limits for both the protection of aquatic life (EPA 1986) and the state of Alaska drinking water standards. Under this alternative, predicted mining would further impact water quality. However, an approved operation would be required to comply with all state and federal water regulations and NPS water protection requirements. Potential developments associated with the nonmining uses of patented claims would have additional impacts on water quality. The cumulative impacts of past placer mining and this alternative would be minor. Under this alternative, the impacts of mining on water quality would be less than those for alternative A, greater than those for alternative D, and potentially greater than for alternative C.

Arctic Grayling Habitat

Woodchopper/Coal/Sam Creek Study Area. Under alternative B, resource protection goals would be used as one of the methods of impact analysis in evaluating a mining plan of operations. Past placer mining operations have caused major stream habitat alterations. Because of these alterations, the long- and short-term resource protection goals could not be met. A total of 33.9 arctic grayling HUs have been lost. Accordingly, a mining plan of operations may not be approved without appropriate and potentially extensive mitigation or other operation requirements to lessen the impact on arctic grayling habitat. The long- and short-term effects that would result from new mining activities would be less than alternative A. The long-term impacts that would result from new mining activity would reduce arctic grayling habitat by less than 2.3 HUs. The short-term losses of habitat would be less than 7.3 HUs. The actual reduction of impacts in alternative B, over those in alternative A, would depend on the site specific potential for mitigation, protection of sensitive areas, and the provisions of a specific plan of operations.

Cumulative Impacts - The total cumulatiye long-term impacts to arctic grayling habitat are composed of both past impacts and impacts predicted under this alternative. Past mining activities reduced the arctic grayling habitat by 33.9 HUs, leaving a total of 117.1 HUs, or 72.7 percent of the premining total (table 21). This is less than the amount of habitat needed to meet either the long- or short-term resource protection goal. Additional long-term losses of arctic grayling habitat from new mining would be less than 2.3 HUs. Short-term habitat losses would be less than 7.3 HUs.

Under this alternative, possible consequences of the long-term reductions in arctic grayling habitat include reduced survival, avoidance of spawning and feeding areas, displacement of fish, change in age class structure, and reduced or eliminated fish populations both downstream and upstream of the mine site (table 14).

Conclusion - Past mining activities have already had a major, long-term impact on arctic grayling habitat through the loss of 33.9 HUs. The HUs lost is also above that recommended for short-term losses by the resource protection goals. Potential developments associated with the nonmining uses of patented claims could have additional impacts on arctic grayling habitat and the fish that use it. Overall, the impacts on arctic grayling habitat associated with the implementation of alternative B would be less than those associated with alternative A. This would result from the requirement of potentially extensive mitigation or other operational requirements to lessen the impacts to arctic grayling habitat.

Fourth of July Creek Study Area. Past placer mining operations in this study area have caused substantial stream habitat alterations. A total of 3.1 arctic grayling HUs have been lost. The total amount of study area grayling habitat is only 0.1 HUs above the resource protection goal. An additional loss of more than 0.1 HUs could cause major impacts. Accordingly, a mining plan of operations would may not be approved without appropriate and potentially extensive mitigation or other operation requirements to lessen the impact on arctic grayling habitat. The long- and short-term effects that would result from new mining activities would be less than alternative A. The long-term impacts that would result from new mining activity would reduce arctic grayling habitat by less than 0.9 HUs. The short-term losses of habitat would be less than 3.0 HUs. The actual reduction of impacts in alternative B, over those in alternative A, would depend on the site specific potential for mitigation, protection of sensitive areas, and the provisions of a specific plan of operations.

Cumulative Impacts - The total cumulative long- and short-term impacts to arctic grayling habitat are composed of both past impacts and impacts predicted under this alternative. Past mining activities reduced the grayling habitat to 90.4 percent of the premining total. The total amount of study area grayling habitat is only 0.1 HUs above the study area resource protection goal of 29.1 HUs (table 21). An additional loss of more than 0.1 HUs could cause major long- and short-term impacts. Additional long-term losses of arctic grayling habitat from new mining would be less than 0.9 HUs. Short-term habitat losses would be less than 3.0 HUs.

Under this alternative, possible consequences of the long- and short-term reductions in arctic grayling habitat include reduced survival, avoidance of spawning and feeding areas, displacement of fish, change in age class structure, and reduced or eliminated fish populations both downstream and upstream of the mine site.

Conclusion - Past mining activities have had a substantial impact on arctic grayling habitat through the loss of 3.1 habitat units. Major long- or short-term impacts on grayling habitat could occur if new mining caused an additional loss of more than 0.1 HUs. Potential developments associated with the nonmining uses of patented claims could have additional impacts on arctic grayling habitat and the fish that use it. Overall, the impacts on arctic grayling habitat associated with the implementation of alternative B would be less than those associated with alternative A. This would result from the requirement of potentially extensive mitigation or other operational requirements to lessen the impacts to arctic grayling habitat.

Summary. Under this alternative, the impacts on arctic grayling habitat in the two study areas would be less than those for alternative A, greater than those for alternative D, and potentially greater than those for alternative C. A long-term loss of 37.0 arctic grayling HUs has occurred from past mining activities (table 21). In addition, an undetermined number of mining claims could go to patent. There would be no restrictions on patented claims; required reclamation would be minimal resulting in extended durations of long-term impacts, and the potential for nonmining developments on patented claims, which would create additional impacts on the resource, would be high.

Table 21. Arctic Grayling Habitat Loss Under Alternative B in the Yukon-Charley Rivers National Preserve

	HABITAT (HUs)		LONG-TERM IMPACTS (HABITAT UNITS)				SHORT-TERM IMPACTS (HUs)	
Study Area Drainage	Pre-Mining	Existing (% premining)	Past mining Loss	Existing Cond. Meet RPG?	Altern. Loss	Could Habitat fall Below RPG?	Altern. Loss	Could Habitat fall Below RPG?
Woodchopper	45.1	36.0 (79.8)	9.1	*	0.0	*	< 1.5	*
Coal	66.7	42.0 (63.0)	24.7	*	< 0.1	*	< 0.5	*
Sam	39.2	39.1 (99.7)	0.1	*	< 2.2	*	< 5.3	*
Total	151.0	117.1 (77.5)	33.9	No	< 2.3	Yes	< 7.3	Yes
Fourth of July	32.3	29.2 (90.4)	3.1	Yes	< 0.9	Yes	< 3.0	Yes
Grand Total	183.3	146.3 (79.8)	37.0	*	< 3.2	*	< 10.3	*

* Resource Protection Goals (RPGs) apply to study area totals only

IMPACTS ON WILDLIFE RESOURCES

Short-term habitat loss would occur when animals are displaced from or avoid areas surrounding active mining operations. Vehicle noise, human activity, and other disturbance caused by transporting personnel and equipment to and from mine sites within the study areas would result in short-term habitat reductions along access routes between the claim groups, the Yukon River, and airstrips in Woodchopper, Coal, and Fourth of July creeks, and in the hills between Coal Creek and Sam Creek. Additional long-term habitat loss would be prevented by operators using existing routes or low-impact, all terrain vehicles. Heavy equipment would be moved in the winter across frozen, snow-covered terrain.

Under this alternative, an undetermined number of unpatented claims could be patented without patent restrictions. The impacts from possible nonmining developments on patented claims, such as cabins, subdivisions, or commercial lodges, could result in further permanent loss of habitat. Depending on the location and extent of developments, the construction and occupation of facilities could result in (1) further long-term loss of habitat, (2) further unavailability of habitat due to disturbance, and (3) a greater potential for defense of life and property (DLP) bear mortality.

Possible nonmining impacts inside the study area include the concentration of visitor use along mining access roads and trails. Because of the lack of other overland travel routes, visitors are likely to use mining roads, most of which follow riparian areas from the Yukon River inland. This use would not result in habitat reductions, however. Some sporadic, short-term reductions in available habitat near roads and trails would result due to disturbance.

Possible future impacts on habitat outside the study area include disturbance due to increased visitor use, new tour boat operators, or new, privately-operated lodges along the Yukon River.

Riparian Wildlife Habitat

Woodchopper/Coal/Sam Creek Study Area. Under alternative B, resource protection goals would be used as one of the methods of analysis of impacts in evaluating a mining plan of operations. Because of past mining disturbance in this study area, the long- and short-term resource protection goals for riparian wildlife habitat would not be met. A total of 841 acres have already been disturbed. Accordingly, a mining plan of operations may not be approved without appropriate and potentially extensive mitigation or other operation requirements to lessen the impact on riparian wildlife habitat. The long- and short-term effects that would result from new mining activities would be less than alternative A. The long-term vegetative disturbance that would result from new mining activity would reduce riparian wildlife habitat by less than 70 acres. Effective short-term losses of habitat would be less than 962 acres. The actual reduction of impacts in alternative B, over those in alternative A, would depend on the site specific potential for mitigation, protection of sensitive areas, and the provisions of a specific plan of operations.

Cumulative Impacts - The total cumulative impacts to riparian wildlife habitat are composed of both past impacts and impacts predicted under this alternative. Past mining activities reduced the riparian wildlife habitat by 841 acres, leaving a total of 3,625 acres, or 81 percent of the premining total (table 22). This is less than the amount of habitat needed to meet either the long- or short-term resource protection goal. Additional long-term losses of riparian wildlife habitat from new mining would be less than 70 acres. Effective short-term losses would be less than 962 acres.

Because less mining would occur under this alternative, the potential for defense of life and property bear mortality, although still moderate, would be less than that which is under alternative A.

The primary, life-sustaining resources for many species of wildlife are provided by riparian wildlife habitat. Riparian areas constitute important habitat components for black bear, moose, and many small mammals and birds. Many of these are important prey species for wolves. Under this alternative, possible consequences of the long- and short-term reductions of riparian wildlife habitat include lower species diversity, reduced numbers of individual species, and shifts in species distributions through den or nest abandonment, reduced reproductive success, decreased survival, overuse of adjacent habitat, and increased competition (table 15).

Conclusion - Past mining activities have already had a major, long-term impact on riparian wildlife habitat through the loss of 841 acres. Because of past disturbance, the existing acreage would not meet either the long- or short-term resource protection goals. Potential developments associated with the nonmining uses of patented claims could have additional long-term effects on riparian habitat and the animals that use it. Short-term habitat reductions from nonmining impacts, although minor, would add to the cumulative impacts. Some potential for DLP bear kills would also exist. Overall, the impacts on riparian wildlife habitat associated with the implementation of alternative B would be less than those associated with alternative A. This would result from the requirement of potentially extensive mitigation or other operational requirements to lessen the impact to riparian wildlife habitat.

Fourth of July Creek Study Area. Because of past mining disturbance in this study area, the long-term resource protection goal for riparian wildlife habitat would not be met. A total of 56 acres have already been disturbed. Accordingly, a mining plan of operations would may not be approved without appropriate and potentially extensive mitigation or other operation requirements to lessen the impact on riparian wildlife habitat. The long- and short-term effects that would result from new mining activities would be less than alternative A. The long-term vegetative disturbance that would result from new mining activity would reduce riparian wildlife habitat by less than 20 acres. Effective short-term losses of habitat would be less than 92 acres. The short-term resource protection goal would be met if short-term losses were kept below 83 acres. The actual reduction of impacts in alternative B, over those in alternative A, would depend on the site specific potential for mitigation, protection of sensitive areas, and the provisions of a specific plan of operations.

Cumulative Impacts - The total cumulative impacts to riparian wildlife habitat are composed of both past impacts and impacts predicted under this alternative. Past mining activities reduced the riparian wildlife habitat by 56 acres, leaving a total of 777 acres, or 93.3 percent of the premining total (table 22). This is less that the amount of habitat needed to meet the long-term resource protection goal. Short-term habitat losses resulting from active mining operations could reduce the available riparian wildlife habitat by up to 83 acres, and the short-term resource protection goal would be met. Additional long-term losses of riparian wildlife habitat from new mining would be less than 20 acres. Effective short-term losses would be less than 92 acres.

Because less mining would occur under this alternative, the potential for defense of life and property bear mortality, although still moderate, would be less than under alternative A.

The primary, life-sustaining resources for many species of wildlife are provided by riparian wildlife habitat. Riparian areas constitute important habitat components for black bear, moose, and many small mammals and birds. Many of these are important prey species for wolves. Under this alternative, possible consequences of the long- and short-term reductions of riparian wildlife habitat include lower species diversity, reduced numbers of individual species, and shifts in species distributions through den or nest abandonment, reduced reproductive success, decreased survival, overuse of adjacent habitat, and increased competition (table 15).

Conclusion - Past mining activities have already had a major long-term impact on riparian wildlife habitat through the loss of 56 acres. The short-term loss of riparian wildlife habitat due to local displacement from new mining would be of concern if it exceeded 83 acres. Potential developments associated with the nonmining uses of patented claims could have additional long-term effects on riparian habitat and the animals that use it. Short-term habitat reductions from nonmining impacts, although minor, would add to the cumulative impacts. Some potential for DLP bear kills would also exist. Overall, the impacts on riparian wildlife habitat associated with the implementation of alternative B would be less than those associated with alternative A. This would result from the requirement of potentially extensive mitigation or other operational requirements to lessen the impact to riparian wildlife habitat.

Summary. Under this alternative, the impacts of mining on riparian wildlife habitat in the two study areas would be less than those for alternative A, greater than those for alternative D, and potentially greater than those for alternative C. A long-term loss of 897 acres of habitat has occurred from past mining activities (table 22). In addition, an undetermined number of mining claims could go to patent without patent restrictions, required reclamation would be minimal resulting in extended durations of long-term impacts, and the potential for nonmining developments on patented claims, which would create additional impacts on the resouree, would be high.

Table 22. Riparian Wildlife Habitat Loss Under Alternative B in the Yukon-Charley Rivers National Preserve, Alaska

	HABITAT (ACRES)		LONG-TERM IMPACTS (ACRES)				SHORT-TERM IMPACTS (ACRES)	
Study Area Drainage	Pre-Mining	Existing (% premining)	Past mining Loss	Existing Cond. Meet RPG?	Altern. Loss	Could Habitat fall Below RPG?	Altern. Loss	Could Habitat fall Below RPG?
Woodchopper	1,227	1,101 (89.7)	126	*	< 30	*	< 182	*
Coal	2,081	1,376 (66.1)	705	*	< 20	*	< 739	*
Sam	1,158	1,148 (99.1)	10	*	< 20	*	< 41	*
Total	4,466	3,625 (81.2)	841	No	< 70	Yes	< 962	Yes
Fourth of July	833	777 (93.3)	56	No	< 20	Yes	< 96	Yes
Grand Total	5,299	4,402 (83.1)	897	*	< 90	*	< 1058	*

* Resource Protection Goals (RPGs) apply to study area totals only.

IMPACTS ON THREATENED AND ENDANGERED SPECIES

Peregrine Falcon Prey Habitat

General impacts on wildlife resources discussed under impacts on wildlife resources also pertain to peregrine falcons and their habitat. All riparian wildlife habitat within a 10 mile radius of a peregrine falcon eyrie is considered peregrine falcon prey habitat. Ten miles is considered an average, maximum foraging distance for peregrines in the preserve (Ambrose, pers. comm.), and seven of the 8 prey species most consistently selected by peregrines in the preserve primarily or exclusively inhabit riparian areas (Hunter 1987).

Woodchopper/Coal/Sam Creek Study Area. Vegetative disturbance from past mining activity has disturbed 841 acres of peregrine falcon prey habitat in the study area. Because of the lack of detailed habitat use information on peregrine falcons in the preserve, the total amount of peregrine falcon prey habitat in the study area is unknown.

The impacts of mining on peregrine falcon prey habitat specific to alternative B include long- and short-term losses of primarily low quality habitat. Future long-term vegetative disturbance in the study area from the three placer mining operations predicted by the mineral development scenario would be less than 70 acres. Since each of these operations would occur in riparian corridors, all of the disturbance would involve peregrine falcon prey habitat. Additional, short-term habitat losses would occur when, because of disturbance, birds are displaced from or avoid areas surrounding active mining operations. Short-term habitat losses would reduce the amount of available peregrine falcon prey habitat by less than 51 acres (table 23). The actual reduction of impacts in alternative B, over those in alternative A, would depend on the site specific potential for mitigation, protection of sensitive areas, and the provisions of a specific plan of operations.

Six known peregrine falcon eyries on the Yukon River are located within a probable foraging distance (10 miles) to the claim areas. Three eyries would be affected by operations on the Ben Creek claims, four by the operations on the Sam Creek claims, and five by the operations on the Coal (Boulder Creek) and Woodchopper claims.

Cumulative Impacts - The total cumulative impacts to peregrine falcon prey habitat are composed of both past mining impacts and impacts predicted under this alternative. Past mining activities have reduced peregrine falcon prey habitat by 841 acres. Less than 70 acres of habitat would be lost as a result of new mining activities, and the effective short-term loss of habitat during mining would be less than 96 acres (table 23).

The peregrine falcon prey habitat represented by the riparian corridors in the study area is considered low quality prey habitat except where the streams enter the Yukon River valley (Ambrose, pers. comm.). Although definitive studies documenting peregrine falcon habitat use in Yukon-Charley have not been conducted, studies in other areas have shown that more than 50 percent of all foraging flights of peregrine falcons were within 3 km (1.9 mi.) of their eyries (Ambrose, pers. comm., Beebe 1974, Bird and Aubry 1982, Enderson and Kirven 1983). Further, most foraging flights of peregrines in the area are believed to occur along the Yukon River corridor where the majority of prime prey habitat is located (Ambrose, pers. comm.).

Conclusion - The reductions in peregrine falcon prey habitat that would occur under this alternative would slightly reduce foraging opportunities for peregrine falcons nesting at six eyries located on the Yukon River. The impact on peregrine falcons would not be major.

Fourth of July Creek Study Area. Because of the lack of detailed habitat use information on peregrine falcons in the preserve, the total amount of peregrine falcon prey habitat in the Fourth of July Creek study area is unknown. However, the majority of their prey inhabit riparian areas (Hunter 1987), and thus riparian habitat that is within 10 miles of a peregrine falcon eyrie is considered peregrine falcon prey habitat.

Vegetative disturbance from past mining activity has disturbed 56 acres of peregrine falcon prey habitat in this study area. Future vegetative disturbance in the study area would be less than 20 acres. The mining would occur in a riparian corridor, and thus all of the disturbance would involve peregrine falcon prey habitat. Additional short-term habitat losses would occur when, because of disturbance, birds are displaced from or avoid areas surrounding active mining operations. These short-term habitat losses would reduce the amount of available peregrine falcon prey habitat by less than 20 acres (table 23). The actual reduction of impacts in alternative B, over those in alternative A, would depend on the site specific potential for mitigation, protection of sensitive areas, and the provisions of a specific plan of operations.

Three known peregrine falcon eyries located on the Yukon River are within a probable foraging distance (10 miles) to the mining claims and would be affected by associated habitat disturbance.

Cumulative Impacts - The total cumulative impacts to peregrine falcon prey habitat are composed of both past mining impacts and impacts predicted under this alternative. Past mining activities have reduced peregrine falcon prey habitat by 56 acres. Less than 20 acres of habitat would be lost as a result of new mining activities, and the effective short-term loss of habitat during mining would be less than 96 acres (table 23).

The peregrine falcon prey habitat represented by the riparian corridors in the study area is considered low quality prey habitat except where the streams enter the Yukon River valley (Ambrose, pers. comm.). Although definitive studies documenting peregrine falcon habitat use in Yukon Charley have not been conducted, studies in other areas have shown that more than 50 percent of all foraging flights of peregrine falcons were within 3 km (1.9 mi.) of their eyries (Ambrose, pers. comm., Beebe 1974, Bird and Aubry 1982, Enderson and Kirven 1983). Further, most foraging flights of peregrines in the area are believed to occur along the Yukon River corridor where the majority of prime prey habitat is located (Ambrose, pers. comm.).

Conclusion - The areas of primary habitat disturbance under this alternative would be 7 or more miles from the three closest peregrine falcon eyries, each of which is on the Yukon River. The reductions in peregrine falcon prey habitat that would occur may slightly reduce foraging opportunities for peregrine falcons nesting at these three eyries. The impact on peregrine falcons would not be major.

Summary. The impacts of mining on peregrine falcon prey habitat under alternative B would be less than those in alternative A, greater than those in alternative D, and potentially greater than those in alternative C. The cumulative, long-term loss of habitat would be less than 987 acres. The effective, short-term loss of habitat during mining would be less than 1,058 acres (table 23). However, an undetermined number of mining claims could go to patent without restrictions, reclamation requirements would be less stringent and could result in extended durations of long-term impacts, and the potential for nonmining developments on patented claims, which would create additional impacts on the resource, would be high.

Table 23. Peregrine Falcon Prey Habitat Loss Under Alternative B in the Yukon-Charley Rivers National Preserve, Alaska

	LONG-TERM IMPACTS (ACRES)			SHORT-TERM IMPACTS (ACRES)	
Study Area Drainage	Past Mining Loss	Alternative B Loss	Cumulative Loss	Alternative B Loss	Cumulative Loss
Woodchopper	126	< 30	< 156	< 26	< 182
Coal	705	< 20	< 725	< 14	< 739
Sam	10	< 20	< 30	< 11	< 41
Total	841	< 70	< 911	< 51	< 962
Fourth of July	56	< 20	< 76	< 16	< 96
Grand Total	897	< 90	< 987	< 67	< 1,054

IMPACTS ON VISUAL QUALITY

Woodchopper/Coal/Sam Creek Study Area. Since little or no disturbance occurred before mining, the entire 145,943 acres in the study area was considered to be in a pristine, naturally-appearing condition prior to any mining disturbance. Past mining activity has altered the appearance of 1,116 acres in the study area, reducing the amount of natural appearing landscape by 0.76 percent (table 24).

Areas that have been altered by past mining are noticeably different than the surrounding landscape. The appearance of disturbed areas ranges from completely barren landscapes composed of unvegetated dredge-spoil piles to areas that have been revegetated to various degrees, mostly in vegetative compositions that contrast with the surrounding natural environment.

Cumulative Impacts - The impacts from past and future mining on visual quality are long-term impacts. Under alternative B, less than 70 acres of new disturbance would occur. Combined with past disturbance (1,116 acres), the total long-term impact on visual quality would be less than 1,186 acres, or 0.80 percent of the study area total (table 24). Thus, at least 99.2 percent of the study area landscape would remain in a naturally appearing condition. The actual reduction of impacts in alternative B, over those in alternative A, would depend on the site specific potential for mitigation, protection of sensitive areas, and the provisions of a specific plan of operations.

Under this alternative, an undetermined number of unpatented claims could be patented without patent restrictions. Claims that are patented without restrictions are open to development for nonmining purposes. The impacts from possible future nonmining developments on patented claims, such as cabins, subdivisions, or commercial lodges, would add to the cumulative impacts from mining disturbance.
The only disturbance that is readily visible from the Yukon River, the primary recreational corridor, is at the mouth of Coal Creek. Here, a cabin, a barge unloading site, and some revegetated tailing areas can be seen. The mined areas' greatest scenic impacts are probably realized from the air by passengers in small planes sightseeing or flying over the area.

__Conclusion__ - The reductions in visual quality that would occur under this alternative from past and future vegetative disturbance would not have a major long-term effect on the preserve. However, although the potential for major nonmining developments on patented claims in the future seems low at this point, any future developments that do occur would cumulatively add to the long-term impacts on visual quality.

__Fourth of July Creek Study Area__. Past mining activity has altered a total of 80 acres in this study area (30,598 acres) reducing the amount of natural appearing landscape by 0.26 percent (table 24). Areas that have been altered by past mining are noticeably different than the surrounding landscape. The appearance of disturbed areas ranges from completely barren landscapes composed of unvegetated dredge-spoil piles to areas that have been revegetated to various degrees, mostly in vegetative compositions that contrast with the surrounding natural environment.

__Cumulative Impacts__ - The impacts of past and future mining on visual quality are long-term impacts. Under this alternative, less than 20 acres of new disturbance would occur. Combined with past disturbance (80 acres), the total disturbed acreage representing a long-term impact on visual quality would be less than 100 acres, or 0.33 percent of the total study area acreage (table 24). Thus, at least 99.67 percent of the study area landscape would remain in a naturally appearing condition. The actual reduction of impacts in alternative B, over those in alternative A, would depend on the site specific potential for mitigation, protection of sensitive areas, and the provisions of a specific plan of operations.

Under this alternative, an undetermined number of unpatented claims could be patented without patent restrictions. Claims that are patented without restrictions are open to development for nonmining purposes. The impacts from possible future nonmining developments on patented claims, such as cabins, subdivisions, or commercial lodges, would add to the impacts of disturbed areas.

The majority of current preserve visitors are not affected by the mining-caused landscape disturbance in the Fourth of July Creek watershed. Most of the disturbance lies 5 or more miles from the Yukon River and is out of view. The mined areas' greatest scenic impacts are probably realized from the air by passengers in small planes sightseeing or flying over the area.

__Conclusion__ - The reductions in visual quality that would occur under this alternative from past and future vegetative disturbance would not have a major long-term effect on the preserve. However, although the potential for major nonmining developments on patented claims in the future seems low at this point, any future developments would cumulatively add to the long-term impacts on visual quality. Depending on the location and extent of development, these impacts could become major.

__Summary__. Under this alternative, the impacts of mining on visual quality in the two study areas combined would be less than those under alternative A, greater than those under alternative D, and potentially greater than those in alternative C. The potential for additional, nonmining impacts would be greater than those for alternatives C or D. An undetermined number of mining claims could go to patent without restrictions, reclamation requirements would be less stringent resulting in extended durations of long-term impacts, and the potential for nonmining developments on patented claims, which would create additional impacts on visual quality, would be high.

Table 24. Impacts of Alternative B on Visual Quality in the Yukon-Charley Rivers National Preserve, Alaska

	UNDISTURBED LANDSCAPE		LONG-TERM IMPACTS (ACRES)			
Study Area Drainage	Pre-Mining	Existing (% premining)	Past Mining Loss	Alternative Loss	Cumulative Loss	Percent Loss
Woodchopper	47,025	46,899 (99.7)	337	< 30	< 367	< 0.72
Coal	53,574	52,869 (98.7)	769	< 20	< 789	< 1.47
Sam	45,344	45,334 (99.9)	10	< 20	< 30	< 0.07
Total	145,943	145,102 (99.4)	1,116	< 70	< 1,186	< 0.81
Fourth of July	30,598	30,542 (99.8)	80	< 20	< 100	< 0.33
Grand Total	176,541	175,644 (99.5)	1,196	< 90	< 1,286	< 0.73

IMPACTS ON CULTURAL RESOURCES

The majority of the historic properties documented in the study areas of Yukon-Charley Rivers National Preserve are associated with early placer mining operations. These comprise a wide and diverse array of site types, which include: Habitation sites consisting of roadhouses, single or multiple cabins and structural remains which are associated with historic features; engineering/mining technology sites including examples of drift and open cut mining methods, water diversion systems, dams, ditches, flumes and pipelines; and early mining equipment remains such as hydraulic nozzles, wagons, and draglines. The locations, size and configurations of these historic sites vary considerably from small, isolated pieces of equipment, to large extensive flume or ditch systems extending through many mining claims.

Prehistoric sites in the study areas of the preserve are generally lithic scatters, often associated with cultural features, and are generally situated near creek confluences.

When mining occurs, there is the possibility of impacts to those cultural resources situated on or near mining claims. Potential impacts to prehistoric and historic resources associated with mining development and production are detailed in table 20.

It is not possible, without a specific mining plan of operations that details the extent of proposed mining activities, to assess the extent of the impacts to any specific cultural resources. The National Park Service, under the provisions of a Programmatic Agreement (see appendix 7) with the Advisory Council on Historic Preservation (ACHP) and the Alaska State Historic Preservation Officer, will fulfill its legal obligation to satisfy section 106 of the National Historic Preservation Act (PL 89-665) by evaluating each plan of operations submitted on a case-by-case basis.

During the permitting process the National Park Service will attempt to assure that there will be no adverse effects to the historic properties. If it is determined that there will be unavoidable impacts to eligible historic properties, the National Park Service will consult with the Alaska State Historic Preservation Office to develop a mitigation plan for those impacts.

Conclusion. Under this alternative, the National Park Service will protect cultural resources through the process outlined in the Programmatic Agreement with the Alaska State Historical Preservation Officer and the ACHP (appendix 7).

IMPACTS ON SUBSISTENCE USE OF RESOURCES/SECTION 810 EVALUATION

The overall pattern of subsistence resources use in the region of Yukon-Charley Rivers National Preserve is discussed in the affected environment section. Under alternative B, the permitting requirements delineated in alternative A would apply.

The determination under alternative B of the quantitative cumulative effects on fish and wildlife habitats of past and projected, future mining operations would result in something less than those in alternative A. Please see the discussion in alternative A for an analysis of mining impacts on subsistence uses in the Woodchopper/Coal/Sam Creek and Fourth of July Creek study areas. Under alternative B, there would still be the slight restrictions on subsistence practices delineated in alternative A because of mining disruptions in varying degrees to such wildlife species and their habitats as bear, furbearers, grayling, and moose. However, the quantitative cumulative-effects analysis of comparing all mining plans of operation in the order that they are submitted with all previous ones received would afford an additional layer of protection to the subsistence environment.

Resumed mining at its quantitative cumulative-effects level, under alternative B, would impose no great restrictions on the subsistence uses of resources. There would be no change essentially from existing conditions. Alternative B would offer more protection to the subsistence environment than alternative A because the accumulation of potential disruptions and disturbances to various wildlife species and their habitats would be taken into account under the land-management and mining policies of alternative B.

Conclusion. There would be no major impacts on the subsistence uses of resources under alternative B.

IMPACTS ON WILDERNESS VALUES

Under alternative B, new mining activity and disturbance would impact the wilderness values of portions of the Woodchopper/Coal/Sam Creek and Fourth of July Creek study areas. Up to four placer mines are anticipated to operate under this alternative and would use integrated washing and recovery plants supported by bulldozers, front end loaders, and backhoes. Settling pond systems would be used and streams occasionally diverted during the course of operations. Necessary support facilities, generators, and other equipment would also be included in these placer operations and would affect wilderness values.

Wilderness values, such as solitude and opportunities for primitive and unconfined recreation on mining claims and lands adjacent to these mining activities within the study areas would continue to be affected due to the sights and sounds of mining, related activities, and traffic.

Cumulative Impact. The total cumulative impacts to wilderness values are composed of both past impacts and future impacts predicted under this alternative. According to the proposed alternative in the FEIS for Wilderness Recommendation (NPS 1988), both the Woodchopper/Coal/Sam Creek and the Fourth of July Creek study areas would not be designated as wilderness due to existing development, tailings piles, mining claims, as well as the numerous mining trails in the area. Under alternative B, the potential disturbance that would occur as a result of any future mining activities, together with private inholdings and the potential for other land uses, would continue to impact wilderness values of major portions of the two study areas. Wilderness values of portions of the two study areas could be expected to remain impacted as long as active mining occurs and surface disturbances are evident.

In the long term, it is possible that some of the less disturbed portions of the study area would regain their wilderness values. The most heavily disturbed portions of the study area would not regain their wilderness values until evidence of human activity has been removed and the study area has been reclaimed or allowed to return to its natural state which would not occur in the foreseeable future.

Under this alternative, an undetermined number of unpatented claims could be patented without patent restrictions. The potential for nonmining developments, such as cabin sites and commercial lodges, on these and existing patented mining claims would be high, which would reinforce the study area's nonwilderness character. Mining claims patented without patent restrictions would also have less restrictive reclamation standards applied to mining activities; this would result in longer site-recovery periods and an extended duration of long-term effects to wilderness values.

Under alternative B, it is assumed that all mining operations predicted in the mineral development scenario would not operate at the projected level; therefore, wilderness values on and adjacent to mining claims would more likely be preserved and protected under this alternative than under alternative A. The actual reduction of impacts in alternative B, over those in alternative A, would depend on the site specific potential for mitigation, protection of sensitive areas, and the provisions of a specific plan of operation.

Conclusion. Past mining activities have had an impact on wilderness values in portions of the Woodchopper/Coal/Sam Creek and the Fourth of July Creek study areas. Under this alternative, predicted mining disturbance and mining related activities would further reduce wilderness values in portions of the study areas, but to a lesser degree than in alternative A. Inholdings, mining claims, and access roads found in the study areas would also continue to affect wilderness values in small portions of the study areas. Existing and potential developments associated with nonmining land uses on patented claims could have additional effects on wilderness values.

IMPACTS ON RECREATION AND VISITOR USE

Because it is unlikely that all mining operations predicted in the mineral development scenario would operate simultaneously or at full capacity under alternative B, park resources are more likely to be preserved and protected under this alternative than under alternative A. The actual reduction of impacts in alternative B, over those in alternative A, would depend on the site specific potential for mitigation, protection of sensitive areas, and the provisions of a specific plan of operation.

Many of the recreational uses in the preserve would be impacted by potential mining activities that may occur under the conditions of this alternative. Hunting, sightseeing, hiking and camping are among the recreational pursuits that would be most impacted by mining activities. Mining activities would generally reduce the quality of scenic views and vistas, diminish wilderness values, and disrupt opportunities for solitude. Surface disturbances, such as the loss of vegetation, would affect the area's natural setting and diminish the appreciation of the area by recreational participants. Aesthetic, "natural" qualities and recreation would be impacted by the presence of heavy machinery, vehicles, trailers, housing, equipment, and supplies in the vicinity of mining camps. While mining operations are ongoing, generators, pumps, and other heavy equipment would disrupt solitude and the appreciation of being in a natural environment. Noise from these mining operations would tend to diminish opportunities for viewing and hunting wildlife that tend to avoid areas where operations are ongoing. Vehicle noise, human activity, and other disturbances caused by transporting personnel and equipment to and from mine sites within the study areas would be less than those in alternative A resulting in less impacts to aesthetic qualities, solitude, and natural habitat. In addition, some of the anticipated mining activities could pose safety hazards to visitors in the storage and use of fuels and equipment.

Under this alternative, the mining operations would disrupt up to 90 acres and would degrade scenic qualities by the removal of vegetation, stream channelization and sedimentation, and the presence of equipment and temporary structures. Diminished wildlife habitat in the vicinity of mining operations and the tendency for wildlife to avoid mining operations would consequently reduce hunting and wildlife viewing opportunities in the area.

Alternative B is similar to alternative A because the number of recreational participants of the two study areas would be virtually unchanged from current use levels and trends.

In the long term, the number of visitors to the Woodchopper/Coal/Sam Creek and the Fourth of July Creek study areas would be unaffected and would continue to gradually increase due to the expected increase in recreational demand in the park and preserve as a whole. Recreational quality would gradually increase as the effects of these mining operations become less apparent.

The potential mining activities under this alternative would allow visitors to continue to observe active placer mining in the study area which was an activity that took place in both the two study areas.
An undetermined number of unpatented claims could be patented without patent restrictions. Under alternative B, the potential for nonmining developments on these and existing patented mining claims would be high and would result in increased pressure on the recreational resources of the region due to increased visitor use, new recreational pursuits, and degradation of recreational quality due to increased surface disturbance.

Cumulative Impact. The total cumulative impact on recreational use and quality results from adding the past impacts and the future impacts that are predicted under this alternative. There are relatively few impacts of past mining activities on recreational quality in the Fourth of July Creek and Woodchopper/Coal/Sam Creek study areas. The quality of recreation and visitor use has been affected by surface disturbances associated with mining operations such as the removal of overburden, the formation of settling ponds, and the loss of vegetation which have affected the area's natural setting. Hunting, backpacking, and aerial sightseeing would be impacted most by mining operations that would exist under the conditions of this alternative due to surface disturbances, visual and aural effects, and increased human activity.

Similarly, past impacts on the numbers of visitors to the Fourth of July Creek and Woodchopper/Coal/Sam Creek study areas are negligible. In general, recreational use in the Yukon-Charley National Preserve and the two study areas is relatively light. Under alternative B, visitor use of the study area would not change from the gradually increasing trends that currently exist; therefore, mining would have virtually no cumulative impact on the number of recreational participants in the two study areas.

Conclusion. Because of limited overall preserve usage, there would be limited, if any, impact to the number of recreational participants in the two study areas under this alternative. For the same reason, implementation of this alternative and the resulting mining activity would not have major impacts on the quality of recreational opportunities. Existing and potential development associated with nonmining land uses could have additional short-and long-term effects on recreational use and quality, but these would probably be slight. Overall, the impacts to recreational quality associated with the implementation of alternative B would be less than those associated with alternative A.

IMPACTS ON LOCAL ECONOMY

Implementation of alternative B would likely decrease employment and expenditures from the amount expected in alternative A.

Average annual employment from mining activities in the two study areas under this alternative would likely be less than the 4 to 16 expected under alternative A. Expenditures to the local communities from mining activities would similarly be less under this alternative than the $23,250 expected under alternative A.

Under this alternative, an undetermined number of unpatented claims could be patented without patent restrictions. The potential for nonmining developments on these and existing patented mining claims, such as land subdivision for cabin sites and commercial lodges, would be high under this alternative. The potential nonmining uses of patented claims could provide jobs and economic activity in the local communities.

Cumulative Impact. The total cumulative impact of mining on the socioeconomic environment results from adding the past impacts and the future impacts that are predicted under this alternative. Past mining activities in the Yukon-Charley National Preserve have had an effect on the economies of the local communities. In addition to direct employment, expenditures made by the mining operations for such things as equipment, fuel, and supplies has played a limited role in the economy of most of the local communities.

Because impacts of mining on the economies of the local communities are seasonal and dependent on ongoing operations, only the impacts of active operations are included in cumulative impacts. Implementation of this alternative would decrease mining employment and expenditures from the amount expected in alternative A. Up to 16 mining related jobs and $23,250 in local expenditures could be found under this alternative, although these numbers would be somewhat less due to the potential constraints on the level of mining activity.

Conclusion. Under alternative B, mining related employment and expenditures would probably be less than those expected under alternative A. Potential developments associated with nonmining land uses could have additional beneficial impacts on the economies of the local communities.

Impacts on NPS Mineral Management Program Administration

Management of mining and mineral development activities has increased administrative costs associated with the NPS mineral management program. This program currently employs 20 to 25 people in the NPS Alaska Regional Office, Wrangell-St. Elias and Denali National Park and Preserves. Major mining and mineral management program activities include plan of operation's review and analysis, environmental compliance, validity examinations, claim boundary surveying, claim resource data collecting, operation monitoring and enforcement, and reclamation.

Under alternative B, program administration costs would not change due to the potential continuation of mining activities in the two study areas and the NPS reclamation of disturbed areas on acquired mining claims. Reclamation would be a long-term cost associated with the mineral management program.

Conclusion Administration of the NPS Alaska mineral management program would not be affected by this alternative for the immediate future.

IMPACTS ON PALEONTOLOGICAL RESOURCES

Under alternative B, less than 70 acres of new disturbance within the Woodchopper/Coal/Sam Creek study area, and less than 20 acres of new disturbance in the Fourth of July Creek study area would occur.

The placers located in Mineral, Iron, Boulder, and Ben Creek drainages are steep and underlain by shallow permafrost. As a consequence, material above bedrock has a slow, but continual, downhill motion and is further churned and mixed by annual freeze and thaw cycles. Having lost its stratigraphic context, contained paleontologic material has almost no scientific value. Therefore mining of these placers would have little or no impact on paleontological resources.

Undisturbed areas within the mining claims on Woodchopper, Sam, and Fourth of July creeks cover stratified deposits. Mining of these undisturbed areas could alter deposits containing paleontological material of scientific importance. Impacts in these areas would be avoided by scientifically examining the stratigraphy, age, and fossil content of the section to be mined prior to the approval of a plan of operations.

Cumulative Impacts The total cumulative impacts to paleontological resources are composed of both past impacts and impacts predicted under this alternative. Past mining activity has disturbed 1,116 acres in the Woodchopper/Coal/Sam Creek study area and 80 acres in the Fourth of July Creek study area. Impacts on paleontologic resources within the disturbed areas include the loss or alteration of stratified deposits and contained paleontologic material. The scientific value of lost or modified deposits is unknown.

Under this alternative, an undetermined number of unpatented claims could be patented without patent restrictions. The impacts from nonmining developments on patented claims, such as cabins, subdivisions, or commercial lodges, could result in further modification of stratified deposits containing paleontological material.

Under alternative B, the potential impacts of mining on paleontological resources in the two study areas would be less than those in alternative A and greater than those for alternatives C and D.

Conclusion. Past mining impacts have caused the loss and alteration of paleontological resources with unknown scientific value. Future loss of important paleontological resources would be avoided through scientific examination of stratified deposits within the mining claims prior to mining. Potential developments associated with the nonmining uses of patented claims could add to existing impacts.

UNAVOIDABLE ADVERSE IMPACTS

The primary impacts under this alternative are the result of past mining activities. These include major long-term losses of arctic grayling and riparian wildlife habitat, and long-term losses of peregrine falcon habitat (987 acres), natural landscapes (1,196 acres), and recreation and wilderness values. In addition, permafrost depth, groundwater distributions, and hydrological cycles in the mined drainages have been altered.

Some adverse economic and nonmining impacts would not be prevented under this alternative. The local economy could be adversely affected since mining could be reduced, and mining-related employment and local expenditures could be diminished. The nonmining uses of patented claims could result in additional impacts on fish and wildlife habitat, visual quality, and recreational and wilderness values.

RELATIONSHIP BETWEEN SHORT-TERM USE OF THE ENVIRONMENT AND MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

The removal of the vegetation and muck layers, thawing of permafrost, and dredging, sluicing, and redeposition of gravels during mining operations has major, long-term impacts on the environment. The productivity of mined areas is substantially diminished for extremely long time periods, well in excess of 100 years. Even with the required reclamation on these areas, long-term impacts and diminished productivity could be expected to last for several years. The loss of productivity in stream and riparian corridors also affects adjacent, upland ecosystems. Thus, even if no mining operations occurred in the future, these areas represent a major, long-term loss of productivity.

IRREVERSIBLE OR IRRETRIEVABLE COMMITMENT OF RESOURCES

The only commitment of resources completely irreversible or irretrievable during future mining, under the proposed action, would be the gold removed during mining and possibly paleontological resources lost in the form of stratified deposits containing fossil remains destroyed or washed downstream during mining activities. In addition to these, past mining activities have resulted in irreversible and irretrievable losses of muck layers, topsoil, and permafrost. Muck layers, topsoil, and permafrost in the study areas have taken thousands of years to develop. Past mining relied heavily on hydraulic methods for removing overburden and muck, thus washing nearly all of the organic material downstream. Combined with an increased permafrost depth from thawing and mining gravels, this has caused changes in groundwater and surface water regimes. Since the native vegetation depended on all of these, the original vegetative communities, and the distinct assemblage of animals dependent upon them, are also permanently lost on most of the areas mined in the past. This is not to say that these areas will not support vegetation or habitat for animals in the future. Rather, vegetation and habitats that develop over time will be different from those that existed before mining.

ALTERNATIVE C

Alternative C is identical to alternative B with two exceptions: (1) For valid unpatented claims within the preserve taken to patent in the future, the patent would convey the minerals only, and the claims, if mined, would be subject to a stricter standard for reclamation; and (2) a strengthened mining claim acquisition program would be initiated to acquire valid unpatented claims whose development by mining or would be detrimental to preserve values. The impacts discussed below are based on a moderate level of mining activity (table 1).

IMPACTS ON WETLANDS

Under alternative C, the vegetative disturbance in the two study areas that would result from new mining activity would be less than that of alternative B. Large amounts of riparian habitat were disrupted during past mining (see riparian wildlife habitat section), and much of the riparian habitat is also considered wetlands by definition. Thus, past mining activities have had a major impact on wetlands in the study areas.

The potential for impacts on wetlands from mining operations would be reduced by requiring protection measures outlined by the floodplain and wetlands management guidelines for implementing Executive Orders 11988 and 11990 (appendixes 12 and 13). The Water Resource Protection Measures and Operating Stipulations for Approved Mining Plans of Operations, outlined in appendix 14, could provide additional wetland protection measures.

Under this alternative, the implementation of patent restrictions on newly patented claims would allow the National Park Service to retain ownership of the surface of the claims. Nonmining developments on patented claims, such as cabins, subdivisions, or commercial lodges, would not occur on mining claims patented in the future. The overall potential for developments associated with nonmining land uses would be moderate since these would only be possible on existing claims patented without patent restrictions. Thus, nonmining development activities would only slightly increase the losses of wetlands. Claims patented with restrictions would also have more restrictive reclamation standards applied to mining activities; this would result in shorter site recovery periods and a reduced duration of long-term effects. The strengthened mining claim acquisition program would preclude mining activity or incompatible nonmining uses on acquired claims, which would effect wetlands.

Future placer mining and nonmining development on both patented and unpatented claims which would place dredged and/or fill materials into wetlands would be subject to section 404 of the Clean Water Act (PL 92-500). The U.S. Army Corps of Engineers would regulate all future disposal of dredge and fill materials in wetland areas (appendix 16).

Cumulative Impacts. The total cumulative impacts to wetlands are composed of both past impacts and impacts predicted under this alternative. Past placer mining has caused major modifications of wetlands in the two study areas. These modifications include removal of vegetation, removal of the organic muck layer, increased permafrost table depth, increased erosion, disposal of dredge and fill material, and increased drainage of surface water and groundwater. Past mining has disturbed 841 acres of riparian vegetation in the Woodchopper/Coal/Sam Creek study area and 56 acres in the Fourth of July Creek study area (see aquatic resources and wildlife resources sections). The majority of this disturbance affected wetland plant communities.

Under this alternative, the possible consequences of mining impacts on wetlands include degraded water quality, and loss of fish and wildlife habitat (see aquatic resources and wildlife resources sections).

Conclusion Past mining activities have had a major impact on wetlands in the two study areas. The majority of these impacts involved riparian plant communities (see aquatic resources and wildlife resources sections). The impacts of mining on wetlands would be less than for alternative A or B, but greater than for alternative D. As a result of the strengthened claim acquisition program and patent restrictions loss of wetlands resulting from potential nonmining developments would be less than alternative B.

IMPACTS ON AQUATIC RESOURCES

Impacts caused by past mining operations on water quality and grayling habitat for Woodchopper, Coal, Sam, and Fourth of July Creeks are described under alternative A. Future impacts of individual operations described under alternative A could potentially be the same for this alternative.

Potential impacts caused by mining operations under this alternative would be reduced by meeting state and federal water quality standards and criteria, maintaining natural stream flows, and implementing the water resource protection measures and operating stipulations summarized in appendix 14.

Under this alternative, the implementation of patent restrictions on newly patented claims would allow the National Park Service to retain ownership of the surface of the claims. Nonmining developments on patented claims, such as cabins, subdivisions, or commercial lodges, would not occur on mining claims patented in the future. The overall potential for developments associated with nonmining land uses would be moderate since these would only be possible on existing claims patented without patent restrictions. Thus, nonmining development activities would only slightly degrade water quality or increase the long- and short-term losses of arctic grayling habitat. Claims patented with patent restrictions would also have more restrictive reclamation standards applied to mining activities; this would result in shorter site recovery periods and a reduced duration of long-term effects. The strengthened mining claim acquisition program would preclude mining activity or incompatible nonmining uses on acquired claims, which would reduce impacts on water quality or fish habitat.

Future placer mining and nonmining development on both patented and unpatented claims which would place dredged and/or fill materials into study area waters would be subject to section 404 of the Clean Water Act (PL 92-500). The U.S. Army Corps of Engineers would regulate all future disposal of dredge and fill materials in preserve waters (appendix 16).

Possible nonmining impacts inside the study area include the concentration of visitor use along mining access roads and trails. Because of the lack of other overland travel routes, visitors are likely to use mining roads, most of which follow areas from the Yukon River inland. Additional impacts on water quality and fish habitat from this type of use would be minimal.

Water Quality

Woodchopper/Coal/Sam Creek Study Area Under alternative C, future patents would be restricted to the minerals only and a strengthened claim acquisition program would be implemented. Water quality impacts that would result from new mining activities would be less than those in alternative B. The actual reduction of impacts in alternative C, over those in alternatives A or B, would depend on the site specific potential for mitigation and the provisions of a specific plan of operations.

Cumulative Impacts - The total cumulative impacts to water quality are composed of both past impacts and impacts predicted under this alternative. Past placer mining operations have caused major modifications of the original stream channel and adjacent terrain, thus altering the chemical and physical characteristics of water draining the study area. These modifications include removal of vegetation, removal of the organic muck layer, thawing of permafrost, increased exposure of subsurface rock and soil with high mineral content, and increased erosion. Past mining has affected water quality within 1,116 acres of disturbance and in 30.4 miles of stream. Existing disturbance has not caused major changes in the natural water quality of the study area streams. Additional impacts from new mining would affect less than 70 acres of land cover and less than 31.3 miles of stream. Potential impacts on surface water and/or groundwater caused by past and new mining activities include: (1) altered water regimes, (2) elevated metal concentrations, (3) lowered pH, (4) accelerated erosion and transport of sediments, (5) increased turbidity, and/or (6) pollution from accidental spillage of oil, fuel, or other hazardous materials. Long-term impacts on water quality would be associated with the continued input of sediment into streams from nonpoint runoff of disturbed areas during major storms and flows. Impacts on ground and surface water could reduce the productive capabilities of aquatic and terrestrial organisms in the study area.

Conclusion - Past mining activities have had an impact on existing surface water quality. These impacts have not caused the levels of various water quality parameters to fall outside the acceptable limits for both the protection of aquatic life (EPA 1986) and the state of Alaska drinking water standards. Under this alternative, predicted mining would further impact water quality. However, approved operations would be required to comply with all state and federal water regulations and NPS water protection requirements. As a result of the strengthened claim acquisition program and patent restrictions, the effects on water quality resulting from potential nonmining developments would be less than those in alternative B. The cumulative impacts of past placer mining and this alternative would be minor. Under alternative C, the impacts of mining on water quality would be less than those for alternatives A and B, but greater than those for alternative D.

Fourth of July Creek Study Area Under alternative C, future patents would be restricted to the minerals only and a strengthened claim acquisition program would be implemented. Water quality impacts that would result from new mining activities would be less than those in alternative B. The actual reduction of impacts in alternative C, over those in alternatives A or B, would depend on the site specific potential for mitigation, and the provisions of a specific plan of operations.

Cumulative Impacts - The total cumulative impacts to water quality are composed of both past impacts and impacts predicted under this alternative. Past placer mining operations have caused major modifications of the original stream channel and adjacent terrain, thus altering the chemical and physical characteristics of water draining the study area. These modifications include removal of vegetation, removal of the organic muck layer, thawing of permafrost, increased exposure of subsurface rock and soil with high mineral content, and increased erosion. Past mining has affected water quality within 80 acres of disturbance and in 13.1 miles of stream. Existing disturbance has not caused major changes in the natural water quality of the study area streams. Additional impacts from new mining would affect less than 20 acres of land cover and less than 13.1 miles of stream. Potential impacts on surface water and/or groundwater caused by past and new mining activities include: (1) altered water regimes, (2) elevated metal concentrations, (3) lowered pH, (4) accelerated erosion and transport of sediments, (5) increased turbidity, and/or (6) pollution from accidental spillage of oil, fuel, or other hazardous materials. Long-term impacts on water quality would be associated with the continued input of sediment into streams from nonpoint runoff of disturbed areas during storms and high flows. Impacts on ground water and surface water could reduce the productive capabilities of aquatic and terrestrial organisms in the study area.

Conclusion - Past mining activities have had an impact on existing surface water quality. These impacts have not caused the levels of various water quality parameters to fall outside the acceptable limits for both the protection of aquatic life (EPA 1986) and the state of Alaska drinking water standards. Under this alternative, predicted mining would further impact water quality. However, an approved operation would be required to comply with all state and federal water regulations and NPS water protection requirements. As a result of the strengthened claim acquisition program and patent restrictions, the effects on water quality resulting from potential nonmining developments would be less than those in alternative B. The cumulative impacts of past placer mining and this alternative would be minor. Under alternative C, the impacts of mining on water quality would be less than those for alternatives A and B, but greater than those for alternative D.

Arctic Grayling Habitat

Woodchopper/Coal/Sam Creek Study Area Under alternative C, resource protection goals would be used as one of the methods of impact analysis in evaluating a mining plan of operations. Future patents would be restricted to the minerals only, and a strengthened claim acquisition program would be implemented. Past placer mining operations have caused major stream habitat alterations. Because of these alterations, the long- and short-term resource protection goals could not be met. A total of 33.9 arctic grayling HUs have been lost. Accordingly, a mining plan of operations may not be approved without appropriate and potentially extensive mitigation or other operation requirements to lessen the impact on arctic grayling habitat. The long- and short-term effects that would result from new mining activities would be less than those in alternative B. The actual reduction of impacts in alternative C, over those in alternative A or B, would depend on the site specific potential for mitigation, protection of sensitive areas, and the provisions of a specific plan of operations.

Cumulative Impacts - The total cumulative long-term impacts to arctic grayling habitat are composed of both past impacts and impacts predicted under this alternative. Past mining activities reduced the arctic grayling habitat by 33.9 HUs, leaving a total of 117.1 HUs, or 72.7 percent of the premining total (table 25). This is less than the amount of habitat needed to meet either the long- or short-term resource protection goal. Additional long-term losses of arctic grayling habitat from new mining would be less than 2.3 HUs. Short-term habitat losses would be less than 7.3 HUs.

Under this alternative, possible consequences of the long-term reductions in arctic grayling habitat include reduced survival, avoidance of spawning and feeding areas, displacement of fish, change in age class structure, and reduced or eliminated fish populations both downstream and upstream of the mine site (table 14).

Conclusion - Past mining activities have already had a major, long-term impact on arctic grayling habitat through the loss of 33.9 HUs. The HUs lost is also above that recommended for short-term losses by the resource protection goals. As a result of the strengthened claim acquisition program and patent restrictions, the long- and short-term effects on arctic grayling habitat resulting from potential nonmining developments would be less than alternative B. Overall, the impacts on arctic grayling habitat associated with the implementation of alternative C would be less than those associated with alternative B. This would result from the required mitigation or other operational requirements to lessen the impacts to arctic grayling habitat.

Fourth of July Creek Study Area Past placer mining operations in this study area have caused substantial stream habitat alterations. A total of 3.1 arctic grayling HUs have been lost. The total amount of study area grayling habitat is only 0.1 HUs above the resource protection goal. An additional loss of more than 0.1 HUs could cause major impacts. Accordingly, a mining plan of operations may not be approved without appropriate and potentially extensive mitigation or other operation requirements to lessen the impact on arctic grayling habitat. The long- and short-term effects that would result from new mining activities would be less than those in alternative B. The actual reduction of impacts in alternative C, over those in alternatives A or B would depend on the site specific potential for mitigation, protection of sensitive areas, and the provisions of a specific plan of operations.

Cumulative Impacts - The total cumulative long- and short-term impacts to arctic grayling habitat are composed of both past impacts and impacts predicted under this alternative. Past mining activities reduced the grayling habitat by 3.1 HUs, leaving a total of 29.2 HUs, or 90.4 percent of the premining total. The total amount of study area grayling habitat is only 0.1 HUs above the study area resource protection goal of 29.1 HUs (table 25). An additional loss of more than 0.1 HUs could cause major long- and short-term impacts. Additional long-term losses of arctic grayling habitat from new mining would be less than 0.9 HUs. Short-term habitat losses would be less than 3.0 HUs.

Under this alternative, possible consequences of the long- and short-term reductions in arctic grayling habitat include reduced survival, avoidance of spawning and feeding areas, displacement of fish, change in age class structure, and reduced or eliminated fish populations both downstream and upstream of the mine site (table 14).

Conclusion - Past mining activities have had a substantial impact on arctic grayling habitat through the loss of 3.1 habitat units. Major long- or short-term impacts on grayling habitat could occur if new mining caused an additional loss of more than 0.1 HUs. As a result of the strengthened claim acquisition program and patent restrictions, the long- and short-term effects on arctic grayling habitat resulting from potential nonmining developments would be less than those in alternative B. Overall, the impacts on arctic grayling habitat, associated with the implementation of alternative C, would be less than those associated with alternative B. This would result from the requirement of potentially extensive mitigation or other operational requirements to lessen the impacts to arctic grayling habitat.

Summary. Under this alternative, the impacts on arctic grayling habitat in the two study areas would be less than those for alternative A or B, but greater than those for alternative D. A long-term loss of 37.0 arctic grayling HUs has occurred from past mining activities (table 25). Additional long- and short-term impacts would be less than those in alternative B. Patent restrictions and reclamation requirements applied to all newly patented claims, and the strengthened claim acquisition program would (1) lower the potential for nonmining impacts, and (2) result in reduced durations of long-term impacts.

Table 25. Arctic Grayling Habitat Loss Under Alternative C in the Yukon-Charley Rivers National Preserve

	HABITAT (HUs)		LONG-TERM IMPACTS (HABITAT UNITS)				SHORT-TERM IMPACTS (HUs)	
Study Area Drainage	Pre-Mining	Existing (% premining)	Past mining Loss	Existing Cond. Meet RPG?	Altern. Loss	Could Habitat fall Below RPG?	Altern. Loss	Could Habitat fall Below RPG?
Woodchopper	45.1	36.0 (79.8)	9.1	*		*		*
Coal	66.7	42.0 (63.0)	24.7	*		*		*
Sam	39.2	39.1 (99.7)	0.1	*		*		*
Total	151.0	117.1 (77.5)	33.9	No	< Alt. B	Yes	< Alt. B	Yes
Fourth of July	32.3	29.2 (90.4)	3.1	Yes	< Alt. B	Yes	< Alt. B	Yes
Grand Total	183.3	146.3 (79.8)	37.0	*	< Alt. B	*	< Alt. B	*

* Resource Protection Goals (RPGs) apply to study area totals only

IMPACTS ON WILDLIFE RESOURCES

Short-term habitat loss would occur when animals are displaced from or avoid areas surrounding active mining operations. The maximum short-term effect would occur when all four mining operations, predicted by the mineral development scenario, were operating simultaneously.

Vehicle noise, human activity, and other disturbance caused by transporting personnel and equipment to and from mine sites within the study areas would result in short-term habitat reductions along access routes between the claim groups, the Yukon River, and airstrips in Woodchopper, Coal, and Fourth of July creeks, and in the hills between Coal and Sam creeks. These short-term habitat reductions would be less than in alternative B. Additional long-term habitat loss would be prevented by operators using existing routes or low-impact, all terrain vehicles. Heavy equipment would be moved in the winter across frozen, snow-covered terrain.

Under this alternative, the implementation of patent restrictions on newly patented claims would allow the National Park Service to retain ownership of the surface of the claim. Nonmining developments, such as cabins, subdivisions, or commercial lodges, would not occur on mining claims patented in the future. The overall potential for developments associated with nonmining land uses would be moderate since these would only be possible on existing claims patented without patent restrictions. Thus, nonmining development activities would only slightly increase the long- and short-term losses of wildlife habitat. Claims patented with restrictions would also have more restrictive reclamation standards applied to mining activities; this would result in shorter site recovery periods and a reduced duration of long-term effects. The strengthened mining claim acquisition program would preclude mining activity or incompatible nonmining uses on acquired claims, which would reduce habitat losses.

Possible nonmining impacts inside the study area include the concentration of visitor use along mining access roads and trails. Because of the lack of other overland travel routes, visitors are likely to use mining roads, most of which follow riparian areas from the Yukon River inland. This use would not result in habitat reductions, however. Some sporadic, short-term reductions in available habitat near roads and trails would result, but they would be less than those under alternative B.

Possible future impacts on habitat outside the study area include disturbance due to increased visitor use, new tour boat operators, or new commercial lodges along the Yukon River.

Riparian Wildlife Habitat

Woodchopper/Coal/Sam Creek Study Area Under alternative C, resource protection goals would be used as one of the methods of analysis in evaluating a mining plan of operations. Future patents would be restricted to the minerals only, and a strengthened claim acquisition program would be implemented.

Because of past mining disturbance in this study area, the long- and short-term resource protection goals for riparian wildlife habitat would not be met. A total of 841 acres have already been disturbed. Accordingly, a mining plan of operations may not be approved without appropriate and potentially extensive mitigation or other operation requirements to lessen the impact on riparian wildlife habitat. The long- and short-term effects that would result from new mining activities would be less than alternative B. The actual reduction of impacts in alternative C, over those in alternatives A or B, would depend on the site specific potential for mitigation, protection of sensitive areas, and the provisions of a specific plan of operations.

Cumulative Impacts - The total cumulative impacts to riparian wildlife habitat are composed of both past impacts and impacts predicted under this alternative. Past mining activities reduced the riparian wildlife habitat by 841 acres, leaving a total of 3,625 acres, or 81 percent of the premining total (table 26). This is less than the amount of habitat needed to meet either the long- or short-term resource protection goal. The long-term vegetative disturbance that would result from new mining activity would reduce riparian wildlife habitat less than that of alternative B. Short-term habitat losses would also be less than alternative B.

Defense of life and property bear mortality would be less than that for alternative B because the number of nonmining developments in or near bear habitat would be reduced.

The primary, life-sustaining resources for many species of wildlife are provided by riparian wildlife habitat. Riparian areas constitute important habitat components for black bear, moose, and many small mammals and birds. Many of these are important prey species for wolves. Under this alternative, possible consequences of the long- and short-term reductions of riparian wildlife habitat include lower species diversity, reduced numbers of individual species, and shifts in species distributions through den or nest abandonment, reduced reproductive success, decreased survival, overuse of adjacent habitat, and increased competition (table 14).

Conclusion - Past mining activities have already had a major, long-term impact on riparian wildlife habitat through the loss of 841 acres. Because of past disturbance, the existing acreage would not meet either the long- or short-term resource protection goals. As a result of the strengthened claim acquisition

Table 26. Riparian Wildlife Habitat Loss Under Alternative C in the Yukon-Charley Rivers National Preserve, Alaska

	HABITAT (ACRES)		LONG-TERM IMPACTS (ACRES)				SHORT-TERM IMPACTS (ACRES)	
Study Area Drainage	Pre-Mining	Existing (% premining)	Past mining Loss	Existing Cond. Meet RPG?	Altern. Loss	Could Habitat fall Below RPG?	Altern. Loss	Could Habitat fall Below RPG?
Woodchopper	1,227	1,101 (89.7)	126	*		*		*
Coal	2,081	1,376 (66.1)	705	*		*		*
Sam	1,158	1,148 (99.1)	10	*		*		*
Total	4,466	3,625 (81.2)	841	No	< Alt. B	Yes	< Alt. B	Yes
Fourth of July	833	777 (93.3)	56	No	< Alt. B	Yes	< Alt. B	Yes
Grand Total	5,299	4,402 (83.1)	897	*	< Alt. B	*	< Alt. B	*

* Resource Protection Goals (RPGs) apply to study area totals only

program and patent restrictions, the long- and short-term effects on riparian wildlife habitat resulting from potential nonmining developments would be less than those in alternative B. Some potential for DLP bear kills would exist. Overall, the impacts on riparian wildlife habitat, associated with the implementation of alternative C, would be less than those associated with alternative B. This would result from the requirement of potentially extensive mitigation or other operational requirements to lessen the impact to riparian wildlife habitat.

__Fourth of July Creek Study Area__ Because of past mining disturbance in this study area, the long-term resource protection goal for riparian wildlife habitat would not be met. A total of 56 acres have already been disturbed. Accordingly, a mining plan of operations may not be approved without appropriate and potentially extensive mitigation or other operation requirements to lessen the impact on riparian wildlife habitat. The long- and short-term effects that would result from new mining activities would be less than alternative B. The actual reduction of impacts in alternative C, over those in alternative A or B, would depend on the site specific potential for mitigation, protection of sensitive areas, and the provisions of a specific plan of operations.

__Cumulative Impacts__ - The total cumulative impacts to riparian wildlife habitat are composed of both past impacts and impacts predicted under this alternative. Past mining activities reduced the riparian wildlife habitat by 56 acres, leaving a total of 777 acres, or 93.3 percent of the premining total (table 26). This is less that the amount of habitat needed to meet the long-term resource protection goal. Short-term habitat losses resulting from active mining operations could reduce the available riparian wildlife habitat by up to 83 acres, and the short-term resource protection goal would be met. As stated above, the long-term vegetative disturbance that would result from new mining activity would reduce grizzly bear habitat less than alternative B. Short-term habitat losses would also be less than alternative B.

Defense of life and property bear mortality would be less than for alternative B because the number of nonmining developments in or near bear habitat would be reduced.

The primary, life-sustaining resources for many species of wildlife are provided by riparian wildlife habitat. Riparian areas constitute important habitat components for black bear, moose, and many small mammals and birds. Many of these are important prey species for wolves. Under this alternative, possible consequences of the long- and short-term reductions of riparian wildlife habitat include lower species diversity, reduced numbers of individual species, and shifts in species distributions through den or nest abandonment, reduced reproductive success, decreased survival, overuse of adjacent habitat, and increased competition (table 14).

Conclusion - Past mining activities have already had a major long-term impact on riparian wildlife habitat through the loss of 56 acres. The short-term loss of riparian wildlife habitat due to local displacement from new mining would be of concern if it exceeded 83 acres. As a result of the strengthened claim acquisition program and patent restrictions, the long- and short-term effects on riparian wildlife habitat resulting from potential nonmining developments would be less than those in alternative B. Some potential for DLP bear kills would exist. Overall, the impacts on riparian wildlife habitat associated with the implementation of alternative C would be less than those associated with alternative B. This would result from the requirement of potentially extensive mitigation or other operational requirements to lessen the impact to riparian wildlife habitat.

Summary. Under this alternative, the impacts of mining on riparian wildlife habitat in the two study areas would be less than those for alternatives A or B but greater than for alternative D. A long-term loss of 897 acres of habitat has occurred from past mining activities (table 26). Additional long- and short-term impacts would be less than in alternative B. Patent restrictions and reclamation requirements applied to all newly patented claims, and the strengthened claim acquisition program would lower the potential for nonmining impacts, and result in reduced durations of long-term impacts.

IMPACTS ON THREATENED AND ENDANGERED SPECIES

Peregrine Falcon Prey Habitat

General impacts on wildlife resources discussed under impacts on wildlife resources also pertain to peregrine falcons and their habitat. All riparian wildlife habitat within a 10 mile radius of a peregrine falcon eyrie is considered peregrine falcon prey habitat. Ten miles is considered an average, maximum foraging distance for peregrines in the preserve (Ambrose, pers. comm.), and seven of the 8 prey species most consistently selected by peregrines in the preserve primarily or exclusively inhabit riparian areas (Hunter 1987).

Under alternative C, future patents would be restricted to the minerals only and a strengthened claim acquisition program would be implemented.

Woodchopper/Coal/Sam Creek Study Area Vegetative disturbance from past mining activity has disturbed 841 acres of peregrine falcon prey habitat in the study area. Because of the lack of detailed habitat-use information on peregrine falcons in the preserve, the total amount of peregrine falcon prey habitat in the study area is unknown.

The impacts of mining on peregrine falcon prey habitat specific to alternative C include long- and short-term losses of primarily low quality habitat. Future long- and short-term vegetative disturbance in the study area would be less than disturbance in alternative B. Since each of these operations would occur in riparian corridors, all of the disturbance would involve peregrine falcon prey habitat. The actual reduction of impacts in alternative C, over those in alternatives A or B, would depend on the site specific potential for mitigation, protection of sensitive areas, and the provisions of a specific plan of operations.

Six known peregrine falcon eyries on the Yukon River are located within a probable foraging distance (10 miles) to the claim areas. Three eyries would be affected by operations on the Ben Creek claims, four by operations on the Sam Creek claims, and five by operations on the Coal (Boulder Creek) and Woodchopper Creek claims.

Cumulative Impacts - The total cumulative impacts to peregrine falcon prey habitat are composed of both past mining impacts and impacts predicted under this alternative. Past mining activities have reduced peregrine falcon prey habitat by 841 acres. As stated above, the long- and short-term habitat disturbance that would result from new mining activities would be less than those under alternative B.
The peregrine falcon prey habitat represented by the riparian corridors in the study area is considered low quality prey habitat except where the streams enter the Yukon River valley (Ambrose, pers. comm.). Although definitive studies documenting peregrine falcon habitat use in Yukon-Charley have not been conducted, studies in other areas have shown that more than 50 percent of all foraging flights of peregrine falcons were within 3 km (1.9 mi.) of their eyries (Ambrose, pers. comm.; Beebe 1974; Bird and Aubry 1982; Enderson and Kirven 1983). Further, most foraging flights of peregrines in the area are believed to occur along the Yukon River corridor where the majority of prime prey habitat is located (Ambrose, pers. comm.).

Conclusion - The reductions in peregrine falcon prey habitat that would occur under this alternative would slightly reduce foraging opportunities for peregrine falcons nesting at six eyries located on the Yukon River. The impact on peregrine falcons would be minor.

Fourth of July Creek Study Area. Because of the lack of detailed habitat use information on peregrine falcons in the preserve, the total amount of peregrine falcon prey habitat in the Fourth of July Creek study area is unknown. However, the majority of their prey inhabit riparian areas (Hunter 1987), and thus riparian habitat that is within 10 miles of a peregrine falcon eyrie is considered peregrine falcon prey habitat.

Vegetative disturbance from past mining activity has disturbed 56 acres of peregrine falcon prey habitat in this study area. Future vegetative long- and short-term disturbance in the study area would be less than under alternative B. The mining would occur in a riparian corridor, and thus all of the disturbance would involve peregrine falcon prey habitat. The actual reduction of impacts in alternative C, over those in alternatives A or B, would depend on the site specific potential for mitigation, protection of sensitive areas, and the provisions of a specific plan of operations.

Three known peregrine falcon eyries located on the Yukon River are within a probable foraging distance (10 miles) to the claims and would be affected by associated habitat disturbance.

Cumulative Impacts - The total cumulative impacts to peregrine falcon prey habitat are composed of both past mining impacts and impacts predicted under this alternative. Past mining activities have reduced peregrine falcon prey habitat by 56 acres. As stated above, the long- and short-term habitat disturbance that would result from new mining activities would be less than under alternative B.

The peregrine falcon prey habitat represented by the riparian corridors in the study area is considered low quality prey habitat except where the streams enter the Yukon River valley (Ambrose, pers. comm.). Although definitive studies documenting peregrine falcon habitat use in Yukon Charley have not been conducted, studies in other areas have shown that more than 50 percent of all foraging flights of peregrine falcons were within 3 km (1.9 mi.) of their eyries (Ambrose, pers. comm.; Beebe 1974; Bird and Aubry 1982; Enderson and Kirven 1983). Further, most foraging flights of peregrines in the area are believed to occur along the Yukon River corridor where the majority of prime prey habitat is located (Ambrose, pers. comm.).

Conclusion - The areas of primary habitat disturbance under this alternative would be 7 or more miles from the three closest peregrine falcon eyries, each of which is on the Yukon River. The reductions in peregrine falcon prey habitat that would occur may slightly reduce foraging opportunities for peregrine falcons nesting at these three eyries. The impact on peregrine falcons would not be major.

Summary. The impacts of mining on peregrine falcon prey habitat under alternative C would be less than those in alternatives A or B, but greater than those in alternative D. A long-term loss of 897 acres of habitat has occurred from past mining activities (table 27). Additional long- and short-term impacts would be less than in alternative B. Patent restrictions and reclamation requirements applied to all newly patented claims, and the strengthened claim acquisition program would lower the potential for nonmining impacts, and result in reduced durations of long-term impacts.

Table 27. Peregrine Falcon Prey Habitat Loss Under Alternative C in the Yukon-Charley Rivers National Preserve, Alaska

	LONG-TERM IMPACTS (ACRES)			SHORT-TERM IMPACTS (ACRES)	
Study Area Drainage	Past Mining Loss	Alternative C Loss	Cumulative Loss	Alternative C Loss	Cumulative Loss
Woodchopper	126				
Coal	705				
Sam	10				
Total	841	< Alt. B	< Alt. B	< Alt. B	< Alt. B
Fourth of July	56	< Alt. B	< Alt. B	< Alt. B	< Alt. B
Grand Total	897	< Alt. B	< Alt. B	< Alt. B	< Alt. B

IMPACTS ON VISUAL QUALITY

General Impacts Common To Both Study Areas

Under this alternative, the implementation of patent restrictions on newly patented claims would allow the National Park Service to retain ownership of the surface of the claim. Nonmining developments, such as cabins, subdivisions, or commercial lodges, would not occur on mining claims patented in the future. The overall potential for developments associated with nonmining land uses would be moderate since these would only be possible on existing claims patented without patent restrictions. Thus, nonmining development activities would increase the potential for long-term landscape disturbance less than under alternative B. Claims patented with patent restrictions would also have more restrictive reclamation standards applied to mining activities; this would result in shorter site recovery periods and a reduced duration of long-term effects. The strengthened mining claim acquisition program would preclude mining activity or incompatible nonmining uses on acquired claims, which would reduce impacts on visual quality.

Woodchopper/Coal/Sam Creek Study Area. Since little or no disturbance took place before mining, the entire 145,943 acres in the study area was considered to be in a pristine, naturally-appearing condition prior to any mining disturbance. Past mining activity has altered the appearance of 1,116 acres in the study area, reducing the amount of natural appearing landscape by 0.76 percent (table 28).

Areas that have been altered by past mining are noticeably different than the surrounding landscape. The appearance of disturbed areas ranges from completely barren landscapes composed of unvegetated dredge-spoil piles to areas that have been revegetated to various degrees, mostly in vegetative compositions that contrast with the surrounding natural environment.

Cumulative Impacts - The impacts from past and future mining on visual quality are long-term impacts. Past mining activity has altered the appearance of 1,116 acres in the study area. Future landscape disturbance would be less than those under alternative B. Thus, at least 99.2 percent of the study area landscape would remain in a naturally appearing condition. The actual reduction of impacts in alternative C, over those in alternatives A or B, would depend on the site specific potential for mitigation, protection of sensitive areas, and the provisions of a specific plan of operations.

The majority of current visitors to the preserve are not affected by the areas of mining disturbance. The only disturbance that is readily visible from the Yukon River, the primary recreational corridor, is at the mouth of Coal Creek. Here, a cabin, a barge unloading site, and some revegetated tailing areas can be seen. The mined areas' greatest scenic impacts are probably realized from the air by passengers in small planes sightseeing or flying over the area.

Conclusion - The reductions in visual quality that would occur under this alternative from past and future vegetative disturbance would not have a major long-term effect on the preserve. However, although the potential for major nonmining developments on patented claims in the future seems low at this point, any future developments that do occur would cumulatively add to the long-term impacts on visual quality. Depending on the location and extent of development, these impacts could become major.

Fourth of July Creek Study Area. Past mining activity has altered 80 acres in this study area (30,598 acres) and has reduced the amount of natural appearing landscape by 0.26 percent (table 28). Areas that have been altered by past mining are noticeably different than the surrounding landscape. The appearance of disturbed areas ranges from completely barren landscapes composed of unvegetated dredge-spoil piles to areas that have been revegetated to various degrees, mostly in vegetative compositions that contrast with the surrounding natural environment.

Cumulative Impacts - The impacts of past and future mining on visual quality are long-term impacts. Past mining activity has altered the appearance of 80 acres in this study area. Future landscape disturbance would be less than under alternative B. Thus, at least 99.67 percent of the study area landscape would remain in a naturally appearing condition. The actual reduction of impacts in alternative C over those in alternatives A or B would depend on the site specific potential for mitigation, protection of sensitive areas, and the provisions of a specific plan of operations.

The majority of preserve visitors are not affected by the mining-caused landscape disturbance in the Fourth of July Creek watershed. Most of the disturbance lies 5 or more miles from the Yukon River and is out of view. The mined areas' greatest scenic impacts are probably realized from the air by passengers in small planes sightseeing or flying over the area.

Conclusion - The reductions in visual quality that would occur under this alternative from past and future vegetative disturbance would not have a major long-term effect on the Preserve. However, although the potential for major nonmining developments on patented claims in the future seems low at this point, any future developments would cumulatively add to the long-term impacts on visual quality. Depending on the location and extent of development, these impacts could become major.

Summary. Under this alternative, the impacts of mining on visual quality in the two study areas combined would be less than under alternatives A or B, but greater than alternative D. A long-term landscape disturbance of 1,196 acres has occurred from past mining. Additional long- and short-term impacts would be less than in alternative B. Patent restrictions and reclamation requirements applied to all newly patented claims, and the strengthened claim acquisition program would (1) lower the potential for nonmining impacts, and (2) result in reduced durations of long-term impacts.

Table 28. Impacts of Alternative C on Visual Quality in the Yukon-Charley Rivers National Preserve, Alaska

	UNDISTURBED LANDSCAPE		LONG-TERM IMPACTS (ACRES)		
Study Area Drainage	Pre-Mining	Existing (% premining)	Past Mining Loss	Alternative Loss	Cumulative Loss
Woodchopper	47,025	46,899 (99.7)	337		
Coal	53,574	52,869 (98.7)	769		
Sam	45,344	45,334 (99.9)	10		
Total	14,5943	145,102 (99.4)	1,116	< Alt. B	< Alt. B
Fourth of July	30,598	30,542 (99.8)	80	< Alt. B	< Alt. B
Grand Total	17,6541	175,644 (99.5)	1,196	< Alt. B	< Alt. B

IMPACTS ON CULTURAL RESOURCES

The majority of the historic properties documented in the study areas of Yukon-Charley Rivers National Preserve are associated with early placer mining operations. A wide and diverse array of site types include: habitation sites consisting of roadhouses, single or multiple cabins and structural remains which are associated with historic features; engineering/mining technology sites including examples of drift and open cut mining methods, water diversion systems, dams, ditches, flumes and pipelines; and early mining equipment remains such as hydraulic nozzles, wagons, and draglines. The locations, size and configurations of these historic sites vary considerably from small, isolated pieces of equipment, to large extensive flume or ditch systems extending through many claims.

Prehistoric sites in the study areas of the preserve are generally lithic scatters, often associated with cultural features, and are generally situated near creek confluences.

When mining occurs, there is the possibility of impacts to those cultural resources situated on or near claims. Potential impacts to prehistoric and historic resources associated with mining development and production are detailed in table 20.

It is not possible to assess the extent of the impacts to any specific cultural resources without a specific mining plan of operations that details the extent of proposed mining . The National Park Service, under the provisions of a Programmatic Agreement (see appendix 7) with the Advisory Council on Historic Preservation (ACHP) and the Alaska State Historic Preservation Officer, will fulfill its legal obligation to satisfy section 106 of the National Historic Preservation Act (PL 89-665) by evaluating each plan of operations submitted on a case-by-case basis.

During the permitting process the National Park Service will attempt to assure that there will be no adverse effects to the historic properties. If it is determined that there will be unavoidable impacts to eligible historic properties, the National Park Service will consult with the Alaska State Historic Preservation Office to develop a mitigation plan for those impacts.

Currently, if any cultural resources occur on an unpatented claim being taken to patent, they are generally conveyed to the claimant under the patent process. Under this alternative, because of the restricted mineral patents, there would be a higher potential for increased protection of significant cultural resources.

The acquisition of any cultural resources occurring under the accelerated claim acquisition program would primarily be beneficial. However, the additional regulatory and fiscal responsibilities of the National Park Service, for preservation of eligible historic properties, would require revisions of cultural resources management plans and the commitment of the needed agency resources.

Conclusion. Under this alternative, the National Park Service will protect cultural resources through the process outline in the Programmatic Agreement with the Alaska State Historic Preservation Officer and the ACHP (appendix 7). Mineral patent restriction may provide a higher potential for the protection of cultural resources. Revisions of cultural resources management plans would be required for cultural resources acquired under the claim acquisition program.

IMPACTS ON SUBSISTENCE USE OF RESOURCES/SECTION 810 EVALUATION

The overall pattern of subsistence-resources use in the region of Yukon-Charley Rivers National Preserve is given in the affected environment section. Alternative C is identical to alternative B with the exceptions that future patents would be issued for minerals only on claims in the preserve and that reclamation requirements would be held to the standards of 36 CFR 9.11 (a) (2), which require restoration to "natural conditions" and include provisions for "the safe movement of native wildlife, the reestablishment of native vegetative communities, the normal flow of surface and reasonable flow of subsurface waters, the return of the area to a condition which does not jeopardize visitor safety or public use of the unit, and return of the area to a condition equivalent to its pristine beauty."

Alternative C assumes that reasonable, but restricted uses of land surfaces, would occur for mining purposes. Future mineral patents would limit the use of surface resources to necessary mining pursuits, and present patents would be acquired in terms of the surface estate. Thus, surface development associated with mining would be limited under alternative C to the benefit of the subsistence environment.

Under alternative C, the surface restrictions on mining development would result in impacts that would be less than those in alternative A. Refer to the discussion in alternative A for an analysis of mining impacts on subsistence uses in the Woodchopper/Coal/Sam Creek and Fourth of July Creek study areas. Under alternative C, there would still be the slight restrictions on subsistence practices delineated in alternative A because of mining disruptions in varying degrees to such wildlife species and their habitats as bear, caribou, furbearers, grayling, and moose. However, the quantitative cumulative-effects analysis of comparing all mining plans of operation in the order they are submitted with all previous ones received and with the surface restrictions on mining development, would offer two additional layers of protection to the subsistence environment.

Resumed mining at its quantitative cumulative effects level under alternative C, would not impose extensive restrictions on the subsistence uses of resources. There would be no change essentially from existing conditions. Alternative C would offer more protection to the subsistence environment than those in alternative B and even more than those in alternative A because the accumulation of potential disruptions and disturbances to various wildlife species and their habitats would be taken into account under the land-management and mining policies and the surface restrictions to mining development of alternative C.

Conclusion. There would not be major impacts on the subsistence uses of resources under alternative C.

IMPACTS ON WILDERNESS VALUES

Under alternative C, new mining activity and disturbance would impact the wilderness values of portions of the Woodchopper/Coal/Sam Creek and the Fourth of July Creek study areas. Up to four placer mines are anticipated to operate under this alternative and would use integrated washing and recovery plants supported by bulldozers, front-end loaders, and backhoes. Settling pond systems would be used and streams occasionally diverted during the course of operations. Necessary support facilities, generators, and other equipment would also be included in these placer operations and would also affect wilderness values.

Wilderness values, such as solitude and opportunities for primitive and unconfined recreation on mining claims and lands adjacent to these mining activities within the study areas would continue to be affected due to the sights and sounds of mining, related activities, and traffic.

Cumulative Impact. The total cumulative impacts to wilderness values are composed of both past impacts and future impacts predicted under this alternative. According to the proposed alternative in the FEIS for Wilderness Recommendation (NPS 1988), both the Woodchopper/Coal/Sam Creek and the Fourth of July Creek study areas would not be designated as wilderness due to existing development, tailings piles, mining claims, as well as the numerous mining trails in the area. Under alternative C, the potential disturbance that would occur as a result of any future mining activities, together with private inholdings and the potential for other land uses, would continue to impact wilderness values of major portions of the two study areas. Wilderness values of portions of the two study areas could be expected to remain impacted as long as active mining occurs and surface disturbances are evident.

In the long term, it is possible that some of the less disturbed portions of the study area would regain their wilderness values. The most heavily disturbed portions of the study area would not regain their wilderness values until evidence of human activity has been removed and the study area reclaimed or allowed to return to its natural state which would not occur in the foreseeable future.

Under this alternative, the implementation of patent restrictions on newly patented claims would allow the National Park Service to retain ownership of the claims. Nonmining developments on patented claims, such as cabins, subdivisions, or commercial lodges, would not occur on mining claims patented in the future. The overall potential for developments associated with nonmining land uses would be moderate since these would only be possible on claims patented without patent restrictions. Thus, nonmining development activities would only slightly increase the potential impact on wilderness values. The strengthened mining claim acquisition program would preclude mining activity or incompatible nonmining uses on acquired claims, which would reduce potential impacts on wilderness values.

Under alternative C, it is assumed that all mining operations predicted in the mineral development scenario would not operate at the projected level; therefore, wilderness values on and adjacent to mining claims would more likely be preserved and protected under this alternative than those under alternatives A or B. The actual reduction of impacts in alternative C, over those in alternatives A or B, would depend on the site specific potential for mitigation, protection of sensitive areas, the provisions of a specific plan of operation, future patent restrictions, and mining claim acquisitions.

Conclusion. Past mining activities have had an impact on wilderness values in large portions of the Woodchopper/Coal/Sam Creek and Fourth of July Creek study areas. Under this alternative, future mining disturbance and mining related activities would further reduce wilderness values in portions of the study areas. As a result of the strengthened claim acquisition program and patent restrictions the potential impacts on wilderness values would be less than alternative B. Overall, the impacts on wilderness values associated with the implementation of alternative C, would be less than those associated with alternatives A or B. This would result from the requirement of potentially extensive mitigation requirements or other operational controls to lessen impacts to wilderness values.

IMPACTS ON RECREATION AND VISITOR USE

Under alternative C, like alternatives A and B, recreational use in Woodchopper/Coal/Sam Creek and the Fourth of July Creek study areas would be virtually unchanged. Recreational quality would increase over that which would be found in alternatives A and B due to future patent restrictions and the acquisition program. Natural resources in the preserve are more likely to be preserved and protected under this alternative than under alternative A.

Hunting, sightseeing, hiking and camping are among the recreational pursuits that would be impacted by mining activities. Any mining activities that would exist under the conditions of this alternative would generally reduce the quality of scenic views and vistas, diminish wilderness values, and disrupt opportunities for solitude. Surface disturbances that would be caused by the mining activities and the loss of vegetation would affect the area's natural setting and diminish the appreciation of the area by recreationists. Aesthetic natural qualities and recreation would be impacted by the presence of heavy machinery, vehicles, trailers, housing, equipment, and supplies in the vicinity of mining camps. While mining operations are ongoing, generators, pumps, and other heavy equipment would disrupt solitude and the appreciation of being in a natural environment. Noise from these mining operations would tend to diminish opportunities for viewing and hunting the wildlife that tend to avoid areas where operations are ongoing. Although no new access roads to the claims would not be needed, trails and means of access on the claims would affect aesthetic qualities, solitude, as well as disturbing the natural habitat. In addition, some of the anticipated mining activities could present safety hazards to recreationists in the storage and use of fuels and equipment.

On the other hand, the potential continuation of placer mining activities would allow visitors to continue to observe active placer mining in the two study areas which was an activity that took place in both study areas.

In the long term, the number of visitors to the Fourth of July Creek and Woodchopper/Coal/Sam Creeks study areas would be unaffected and would continue to gradually increase in the preserve as a whole. Recreational quality would gradually increase as the effects of these mining operations become less apparent.

Alternative C differs from alternative B because the implementation of patent restrictions on newly patented claims would allow the National Park Service to retain ownership of the surface of the claim. Nonmining developments, such as land subdivision for cabin sites and lodges, would not occur on mining claims patented in the future. The overall potential for developments associated with nonmining land uses would be moderate since these would only be possible on existing patented claims that have no patent restrictions. Therefore, potential nonmining development activities would only slightly increase the recreational impacts associated with these types of developments such as increased pressure on recreational resources and new recreational pursuits.

Cumulative Impact. The total cumulative impact on recreational use and quality results from adding the past impacts and the future impacts as predicted under this alternative. In general, recreational use in the preserve and the two study areas is relatively light. Under alternative C, visitor use of the study area would not change from the patterns and trends that currently exist; therefore, mining has virtually no cumulative impact on the number of recreational participants in the two study areas.

The quality of most recreational pursuits would be decreased by adding together past impacts and the impacts specific to this alternative. Recreation and visitor use have been slightly affected by surface disturbances associated with mining operations such as the removal of overburden, the formation of settling ponds, and the loss of vegetation which have affected the area's natural setting. Hunting, backpacking, and aerial sightseeing would be impacted by any potential mining operations due to surface disturbances, visual and aural effects, and increased human activity.

Conclusion. The number of recreational participants in the two study areas would continue to be limited due to limited overall preserve usage. The potential mining activity and disturbance would not have a major impact on recreational use in the two study areas because of the very limited recreational participation that occurs there. Similarly, implementing this alternative would not have a major impact on the quality of recreational opportunities in either of the two study areas; although as a result of the patent restrictions and the strengthened claim acquisition program, impacts to recreational quality under this alternative would be less than alternative B.

IMPACTS ON LOCAL ECONOMY

Implementation of alternative C would decrease employment and expenditures from the amount expected in in alternative A. Under this alternative, future patents would be restricted to the minerals only and a strengthened claim acquisition program would be implemented.

Average annual employment in the two study areas from mining activities, then, would likely be less than the number of employment opportunities expected in alternatives A or B. Expenditures to the local communities from mining operations would similarly be somewhat less under this alternative than that expected in alternatives A or B.

The implementation of patent restrictions on newly patented claims would allow the National Park Service to retain ownership of the surface of the claim. Nonmining developments, such as land subdivision for cabin sites or commercial lodges, would not occur on mining claims patented in the future. The overall potential for developments associated with nonmining land uses would be moderate since these would only be possible on existing patented claims that have no patent restrictions. Therefore, the patent restrictions would result in potential impacts to the local communities due to the loss of employment and expenditures.

The strengthened claim acquisition program allows claimants to be compensated for their mining claims. It could be expected that some employment and expenditures would be generated by the revenue obtained through this claim acquisition.

Cumulative Impact. The total cumulative impact of mining on the local economy results from adding the past impacts to the future impacts that are predicted under this alternative. Past mining activities in the Yukon-Charley National Preserve have had an effect on the economies of the local communities. In addition to direct employment, expenditures made by the mining operations for such things as equipment, fuel, and supplies have played an important role in the economy of most of the local communities.

Because impacts of mining on the economies of the local communities are seasonal and dependent on on-going operations, only the impacts of active operations are included in cumulative impacts.

The cumulative impact of mining under this alternative could potentially be the same as described above under the specific impacts of alternative C. Mining employment would be less than under alternatives A and B, and local expenditures would likewise be less than those in alternatives A and B due to potential reduction in mining activity.

Conclusion. Under alternative C, mining and nonmining related employment and expenditures would probably decrease over those in alternatives A and B, as a result of the strengthened claim acquisition program and patent restrictions.

Impacts on NPS Mineral Management Program Administration

Management of mining and mineral development activities has increased administrative costs associated with the NPS mineral management program. This program currently employs 20 to 25 people in the NPS Alaska Regional Office, Wrangell-St. Elias and Denali National Park and Preserves. Major mining and mineral management program activities include plan of operation's review and analysis, environmental compliance, validity examinations, claim boundary surveying, claim resource data collecting, operation monitoring and enforcement, and reclamation.

Under alternative C, program administration costs would not change due to the potential continuation of mining activities in the two study areas and the NPS reclamation of disturbed areas on acquired mining claims. Reclamation would be a long-term cost associated with the mineral management program.

Conclusion Administration of the NPS Alaska mineral management program would not be affected by this alternative for the immediate future.

IMPACTS ON PALEONTOLOGICAL RESOURCES

Under alternative C, less than 70 acres of new disturbance within the Woodchopper/Coal/Sam Creek study area and less than 20 acres of new disturbance in the Fourth of July Creek study area would occur.

The placers located in Mineral, Iron, Boulder, and Ben Creek drainages are steep and underlain by shallow permafrost. As a consequence, material above bedrock has a slow, but continual, downhill motion and is further churned and mixed by annual freeze and thaw cycles. Having lost its stratigraphic context, contained paleontologic material has almost no scientific value. Therefore, mining of these placers would have little or no impact on paleontological resources.

Undisturbed areas within the claims on Woodchopper, Sam, and Fourth of July Creeks cover stratified deposits. Mining of these undisturbed areas could alter deposits containing paleontological material of scientific importance. Impacts in these areas would be avoided by scientifically examining the stratigraphy, age, and fossil content of the section to be mined prior to the approval of a plan of operations.

Cumulative Impacts. The total cumulative impacts to paleontological resources are composed of both past impacts and impacts predicted under this alternative. Past mining activity has disturbed 1,116 acres in the Woodchopper/Coal/Sam Creek study area and 80 acres in the Fourth of July Creek study area. Impacts on paleontologic resources within the disturbed areas include the loss or alteration of stratified deposits and contained paleontologic material. The scientific value of lost or modified deposits is unknown.

Under this alternative, the implementation of patent restrictions on newly patented claims would allow the National Park Service to retain ownership of the surface of the claims. Nonmining developments on patented claims, such as cabins, subdivisions, or commercial lodges, would not occur on mining claims patented in the future. The overall potential for developments associated with nonmining land uses would be moderate since these would only be possible on claims patented without patent restrictions. Thus, nonmining development activities would only slightly increase the potential loss of important paleontological resources. The strengthened mining claim acquisition program would preclude mining activity or incompatible nonmining uses on acquired claims, which would reduce potential impacts on scientifically valuable paleontological resources.

Under alternative C, the potential impacts of mining on paleontological resources would be less than those in alternatives A and B, but greater than those for alternative D.

Conclusion. Past mining impacts have caused the loss and alteration of paleontological resources with unknown scientific value. Future loss of important paleontological resources would be avoided through scientific examination of stratified deposits within the claims prior to mining. As a result of the strengthened claim acquisition program and patent restrictions, the potential loss of scientifically important paleontological resources would be less than alternative B. Overall, the potential for impacts on paleontological resources, associated with the implementation of alternative C, would be less than those associated with alternative B.

ALTERNATIVE D

Alternative D eliminates mining related activities from the preserve by acquiring all valid existing rights. While acquisition is proceeding, plans of operations would not be allowed. Mining operations with approved plans of operations would be allowed to complete their activities. Impacts discussed below are based on a low level of mining activity, or no mining, under this alternative (table 1).

IMPACTS ON WETLANDS

Under alternative D, no additional mining related disturbance of wetlands would occur. All claims would be acquired by National Park Service, and nonmining impacts on wetland plant communities would not occur. The National Park Service would reclaim some disturbed wetland areas, which would reduce recovery periods. Some minor impacts could occur during NPS reclamation.

Cumulative Impacts. The total cumulative impacts to wetlands are composed of both past impacts and impacts predicted under this alternative. Past placer mining has caused major modifications of wetlands in the two study areas. These modifications include removal of vegetation, removal of the organic muck layer, increased permafrost table depth, increased erosion, disposal of dredge and fill material, and increased drainage of surface water and groundwater. Past mining has disturbed 841 acres of riparian vegetation in the Woodchopper/Coal/Sam Creek study area and 56 acres in the Fourth of July Creek study area. The majority of this disturbance affected wetland plant communities. Further loss of wetlands or nonmining use of patented claims would not occur under this alternative, and NPS reclamation would help speed the recovery of previously damaged wetlands.

Conclusion. Past mining activities have had a major impact on wetlands in the two study areas. The majority of these impacts involved riparian plant communities (see aquatic resources and wildlife resources sections). Under this alternative, additional mining and nonmining development impacts on wetlands would not occur. NPS reclamation of disturbed areas would result in the shortest wetland recovery period of any of the alternatives. Compared to the other alternatives, alternative D would have the least impact on wetlands in the two study areas.

IMPACTS ON AQUATIC RESOURCES

Impacts caused by past mining operations on water quality and grayling habitat for Woodchopper, Coal, Sam, and Fourth of July creeks are described under alternative A. Under alternative D, additional mining or related water quality impacts or long-term fish habitat reductions would not occur. All claims would be acquired by National Park Service, and nonmining impacts on water quality and fish habitat would be minimal. The National Park Service would reclaim some disturbed areas. Minor short-term impacts would occur during NPS reclamation. Potential impacts caused by reclamation activities would be short-term increases in suspended sediment and associated turbidity. Reclamation of disturbed areas would substantially reduce the duration of long-term impacts on water quality and fish habitat caused by past mining.

Water Quality

Woodchopper/Coal/Sam Creek Study Area. Existing surface disturbance caused by past mining activities have had a minor impact on water quality. Under alternative D, since approved mining plans of operations do not exist in the study area, further mining related impacts on water quality would not occur.

Cumulative Impacts - The total cumulative impacts to water quality are composed of past impacts and predicted impacts under this alternative. Past placer mining operations have caused major modifications of the original stream channels and adjacent terrain, thus altering the chemical and physical characteristics of water draining the study area. These modifications include removal of vegetation, removal of the organic muck layer, increased exposure of subsurface rock and soil with high mineral content, and increased erosion. Past mining has affected surface water quality in 30.4 miles of stream. Additional impacts from mining and nonmining development would not occur under this alternative. Long-term impacts on water quality would be associated with the continued input of sediment into streams from non-point runoff of disturbed areas during storms and high flows.

Conclusion - Past mining activities have had an impact on existing water quality. These impacts have not caused the natural levels of various water quality parameters to fall outside the acceptable limits for both the protection of aquatic life (EPA 1986) and the state of Alaska drinking water standards. Under this alternative, neither additional mining nor nonmining development impacts on water quality would occur. Short-term impacts on water quality caused by NPS reclamation activities would be minor. Reclamation of disturbed areas would result in the shortest duration of long-term impacts of any of the alternatives. The cumulative impacts of past placer mining and those in this alternative would be minor. Compared to the other alternatives, alternative D would have the least impact on water quality in the study area.

Fourth of July Creek Study Area. Existing surface disturbance caused by past mining activities have had a minor impact on water quality. Under alternative D, since no currently approved mining plans of operations exist in the study area, further mining related impacts on water quality would not occur.

Cumulative Impacts - The total cumulative impacts to water quality are composed of both past impacts and predicted impacts under this alternative. Past placer mining operations have caused major modifications of the original stream channel and adjacent terrain, thus altering the chemical and physical characteristics of water draining the study area. These modifications include removal of vegetation, removal of the organic muck layer, increased exposure of subsurface rock and soil with high mineral content, and increased erosion. Past mining has affected surface water quality in 13.1 miles of stream. Additional impacts from mining and nonmining development would not occur under this alternative. Long-term impacts on water quality would be associated with the continued input of sediment into streams from non-point runoff of disturbed areas during storms and high flows.

Conclusion - Past mining activities have had an impact on existing water quality. These impacts have not caused the natural levels of various water quality parameters to fall outside the acceptable limits for both the protection of aquatic life (EPA 1986) and the state of Alaska drinking water standards. Under this alternative, additional mining or nonmining development impacts on water quality would not occur. Short-term impacts on water quality caused by NPS reclamation activities would be minor. Reclamation of disturbed areas would result in the shortest duration of long-term impacts of any of the alternatives. The cumulative impacts of past placer mining and those in this alternative would be minor. Compared to the other alternatives, alternative D would have the least impact on water quality in the study area.

Arctic Grayling Habitat

Woodchopper/Coal/Sam Creek Study Area. Past mining activities have had a major long-term impact on arctic grayling habitat through the loss of 33.9 HUs. Under alternative D, since currently approved mining plans of operations do not exist in the study area, further mining or related arctic grayling habitat reductions would not occur.

Cumulative Impacts - The total cumulative long-term impacts to arctic grayling habitat are composed of both past impacts and impacts predicted under this alternative. Past mining activities reduced the grayling habitat by 33.9 HUs, leaving a total of 117.1 HUs, or 77.5 percent of the premining total (table 30). Minor temporary losses of habitat would occur during NPS reclamation. Other nonmining impacts would not occur under this alternative.

Under this alternative, possible consequences of the long-term reductions in arctic grayling habitat include reduced survival, avoidance of spawning and feeding areas, displacement of fish, change in age class structure, and reduced or eliminated fish populations both downstream and upstream of the disturbed area (table 14).

Conclusion - Under this alternative, further reductions of arctic grayling habitat would not occur. Past mining activities have had a major long-term impact on arctic grayling habitat. However, because of NPS reclamation that would be implemented, the duration of long-term effects from past mining activities would be the shortest of any of the alternatives.

Fourth of July Creek Study Area. Under alternative D, additional mining or related arctic grayling habitat reductions would not occur. All claims would be acquired by National Park Service, and nonmining impacts on grayling habitat would be minimal. Some minor short-term impacts would occur during NPS reclamation. Potential impacts to arctic grayling habitat caused by reclamation activities include increased suspended sediment and associated turbidity. Reclamation of disturbed areas would substantially reduce the duration of long-term impacts on arctic grayling habitat.

Cumulative Impacts - The total cumulative long-term impacts to arctic grayling habitat are composed of past impacts and impacts predicted under this alternative. Past mining activities reduced the grayling habitat to 29.2 HUs. Minor temporary losses of habitat would occur during NPS reclamation. No other nonmining impacts would occur under this alternative.

Under this alternative, possible consequences of the long- and short-term reductions in arctic grayling habitat include reduced survival, avoidance of spawning and feeding areas, displacement of fish, change in age class structure, and reduced or eliminated fish populations downstream and upstream of the disturbed area.

Conclusion - Under this alternative, further reductions of arctic grayling habitat would not occur. Past mining activities have had a substantial impact on arctic grayling habitat. However, the resource protection goals have been met; therefore, impacts on grayling habitat were not major. The duration of long-term effects from past mining activities would be the shortest of any of the alternatives because of the NPS reclamation that would be implemented. Nonmining impacts on grayling habitat would be minor.

Summary. Of all the alternatives, this alternative would have the least impact on arctic grayling habitat in the two study areas. Past mining has caused a long-term loss of 37.0 arctic grayling habitat units in the four study area streams (table 30). No further mining or related habitat reductions or nonmining use of patented claims would occur. The National Park Service would acquire all claims and reclaim some disturbed areas. The duration of long-term impacts from past mining activities would be shorter than any of the other alternatives.

IMPACTS ON WILDLIFE RESOURCES

Under alternative D, no additional mining or related long-term habitat reductions would occur. All claims would be acquired by National Park Service, and nonmining impacts would be limited to minor, short-term, disturbance-induced habitat reductions from visitors concentrating on mining access roads and trails. No potential for mining-related defense of life and property bear kills would exist. The National Park Service would reclaim disturbed sites that are acquired, which would reduce recovery periods and the duration of long-term impacts. Some additional short-term impacts could occur during NPS reclamation of disturbed sites.

Possible future impacts on riparian wildlife habitat outside the study area would include disturbance due to increased visitor use, new tour boat operators, or new commercial lodges along the Yukon River.

Table 30. Arctic Grayling Habitat Loss Under Alternative D in the Yukon-Charley Rivers National Preserve

	HABITAT (HUs)		LONG-TERM IMPACTS (HABITAT UNITS)			SHORT-TERM IMPACTS (HUs)	
Study Area Drainage	Pre-Mining	Existing (% premining)	Past Mining Loss	Alternative D Loss	Cumulative Loss	Alternative D Loss	Cumulative Loss
Woodchopper	45.1	36.0 (79.8)	9.1	0	9.1	0	10.6
Coal	66.7	42.0 (63.0)	24.7	0	24.8	0	25.2
Sam	39.2	39.1 (99.7)	.1	0	2.3	0	5.4
Total	151.0	117.1 (77.5)	33.9	0	36.2	0	41.2
Fourth of July	32.3	29.2 (90.4)	3.1	0	4.0	0	6.1
Grand Total	183.3	146.3 (79.8)	37.0	0	40.2	0	47.3

Riparian Wildlife Habitat

Woodchopper/Coal/Sam Creek Study Area. Past mining activities have had a major long-term impact on riparian wildlife habitat through the loss of 841 acres. Under alternative D, since no currently approved mining plans of operation exist in the study area, no further mining related impacts on riparian wildlife habitat would occur.

Cumulative Impacts - The total cumulative impacts to riparian wildlife habitat are composed of both past impacts and impacts predicted under this alternative. Past mining activities reduced the riparian wildlife habitat by 841 acres, leaving a total of 3,625 acres, or 81 percent of the premining total (table 31). No additional habitat reductions would occur under this alternative.

The primary, life-sustaining resources for many species of wildlife are provided by riparian wildlife habitat. Riparian areas constitute important habitat components for black bears, moose, and many small mammals and birds. Many of these are important prey species for wolves. Under this alternative, possible consequences of the long- and short-term reductions of riparian wildlife habitat include lower species diversity, reduced numbers of individual species, and shifts in species distributions through den or nest abandonment, reduced reproductive success, decreased survival, overuse of adjacent habitat, and increased competition (table 14).

Conclusion - Under this alternative, further long- or short-term reductions of riparian wildlife habitat would not occur. Past mining activities have had a major long-term impact on riparian wildlife habitat. However, because of NPS reclamation that would be implemented, the duration of long-term effects from past mining activities would be the shortest of any of the alternatives. Nonmining impacts would be limited to minor, short-term habitat reductions, and potential for mining-related DLP bear kills would not exist.

Fourth of July Creek Study Area. Past mining activities have had a major long-term impact on riparian wildlife habitat through the loss of 56 acres. Under alternative D, since no currently approved mining plans of operation exist in the study area, no additional mining or related long-term habitat reductions would occur.

Cumulative Impacts - The total cumulative impacts to riparian wildlife habitat are composed of both past impacts and impacts predicted under this alternative. Past mining activities reduced the riparian wildlife habitat by 56 acres, leaving a total of 777 acres, or 93.3 percent of the premining total (table 31). No additional habitat reductions would occur under this alternative.

The primary, life-sustaining resources for many species of wildlife are provided by riparian wildlife habitat. Riparian areas constitute important habitat components for black bears, moose, and many small mammals and birds. Many of these are important prey species for wolves. Under this alternative, possible consequences of the long- and short-term reductions of riparian wildlife habitat include lower species diversity, reduced numbers of individual species, and shifts in species distributions through den or nest abandonment, reduced reproductive success, decreased survival, overuse of adjacent habitat, and increased competition (table 14).

Conclusion - Under this alternative, further long- or short-term reductions of riparian wildlife habitat would not occur. Past mining activities have had a major long-term impact on riparian wildlife habitat. However, because of NPS reclamation that would be implemented, the duration of long-term effects from past mining activities would be the shortest of any of the alternatives. Nonmining impacts would be limited to minor, short-term habitat reductions, and potential for mining-related DLP bear kills would not exist.

Summary. Of all the alternatives, this alternative would have the least impact on the riparian wildlife habitat in the two study areas. Although a major long-term loss of 897 acres of habitat has occurred from past mining activities, further mining or related habitat reductions, DLP kills, or nonmining use of patented claims would not occur. The National Park Service would acquire all claims and reclaim disturbed areas. The duration of long-term impacts from past mining activities would be shorter than any of the other alternatives.

Table 31. Riparian Wildlife Habitat Loss Under Alternative D in the Yukon-Charley Rivers National Preserve, Alaska

	HABITAT (ACRES)		LONG-TERM IMPACTS (ACRES)			SHORT-TERM IMPACTS (ACRES)	
Study Area Drainage	Pre-Mining	Existing (% premining)	Past Mining Loss	Alternative D Loss	Cumulative Loss	Alternative D Loss	Cumulative Loss
Woodchopper	1,227	1,101 (89.7)	126	0	126	0	126
Coal	2,081	1,376 (66.1)	705	0	705	0	705
Sam	1,158	1,148 (99.1)	10	0	10	0	10
Total	4,466	3,625 (81.2)	841	0	841	0	841
Fourth of July	833	777 (93.3)	56	0	56	0	56
Grand Total	5,299	4,402 (83.1)	897	0	897	0	897

IMPACTS ON THREATENED AND ENDANGERED SPECIES

Peregrine Falcon Prey Habitat

General impacts on wildlife resources discussed under impacts on wildlife resources also pertain to peregrine falcons and their habitat. All riparian wildlife habitat within a 10 mile radius of a peregrine falcon eyrie is considered peregrine falcon prey habitat. Ten miles is considered an average, maximum foraging distance for peregrines in the preserve (Ambrose, pers. comm.), and seven of the 8 prey species most consistently selected by peregrines in the preserve primarily or exclusively inhabit riparian areas (Hunter 1987).

Woodchopper/Coal/Sam Creek Study Area. Vegetative disturbance from past mining activity has disturbed 841 acres of peregrine falcon prey habitat in the study area (table 32). Because of the lack of detailed habitat use information on peregrine falcons in the preserve, the total amount of peregrine falcon prey habitat in the study area is unknown.

Under alternative D, additional mining or related long-term habitat reductions would not occur.

Six known peregrine falcon eyries on the Yukon River are located within a probable foraging distance (10 miles) to the claim areas. Areas of past mining disturbance would affect three eyries near the Ben Creek claims, four by the Sam Creek claims, and five by the Coal and Woodchopper claims.

> **Cumulative Impacts** - Past mining activities have reduced peregrine falcon prey habitat by 841 acres. Additional loss of habitat would not occur under this alternative. Short-term habitat reductions would be limited to minor reductions along mining access routes and avoidance around disturbed sites during NPS reclamation.
>
> The peregrine falcon prey habitat represented by the riparian corridors in the study area is considered low quality prey habitat except where the streams enter the Yukon River valley (Ambrose, pers. comm.). Although definitive studies documenting peregrine falcon habitat use in Yukon Charley have not been conducted, studies in other areas have shown that more than 50 percent of all foraging flights of peregrine falcons were within 3 km (1.9 mi.) of their eyries (Ambrose, pers. comm.; Beebe 1974; Bird and Aubry 1982; Enderson and Kirven 1983). Further, most foraging flights of peregrines in the area are believed to occur along the Yukon River corridor where the majority of prime prey habitat is located (Ambrose, pers. comm.).
>
> **Conclusion** - The reductions of peregrine falcon prey habitat resulting from past mining activities may have slightly reduced foraging opportunities for peregrine falcons nesting at six eyries located on the Yukon River. The impact on peregrine falcons is not major, however. Under this alternative, further mining related loss of habitat would not occur. Short-term habitat reductions would be limited to visitor disturbance along access routes and around disturbed sites during NPS reclamation. The duration of long-term effects from past mining would be the shortest of any of the alternatives.

Fourth of July Creek Study Area. Because of the lack of detailed habitat-use information on peregrine falcons in the preserve, the total amount of peregrine falcon prey habitat in the Fourth of July Creek study area is unknown. However, the majority of their prey inhabit riparian areas (Hunter 1987), and, thus, riparian habitat that is within 10 miles of a peregrine falcon eyrie is considered peregrine falcon prey habitat. Vegetative disturbance from past mining activity has disturbed 56 acres of peregrine falcon prey habitat in this study area (table 32).

Under alternative D, additional mining or related long-term habitat reductions would not occur.

Three known peregrine falcon eyries located on the Yukon River are within a probable foraging distance (10 miles) to the claims and may be affected by associated habitat disturbance.

> **Cumulative Impacts** - Past mining activities have reduced peregrine falcon prey habitat by 56 acres. No additional loss of habitat would occur under this alternative. Short-term habitat reductions would be limited to minor reductions along mining access routes and avoidance around disturbed sites during NPS reclamation.

The peregrine falcon prey habitat represented by the riparian corridors in the study area is considered low quality prey habitat except where the streams enter the Yukon River valley (Ambrose, pers. comm.). Although definitive studies documenting peregrine falcon habitat use in Yukon Charley have not been conducted, studies in other areas have shown that more than 50 percent of all foraging flights of peregrine falcons were within 3 km (1.9 mi.) of their eyries (Ambrose, pers. comm.; Beebe 1974; Bird and Aubry 1982; Enderson and Kirven 1983). Further, most foraging flights of peregrines in the area are believed to occur along the Yukon River corridor where the majority of prime prey habitat is located (Ambrose, pers. comm.).

Conclusion - The areas of primary habitat disturbance resulting from past mining activities are 7 or more miles from the three closest peregrine falcon eyries, each of which is located on the Yukon River. Associated habitat reductions may have slightly reduced foraging opportunities for peregrine falcons nesting at these three eyries. The impact on peregrine falcons is not major, however. Under this alternative, further mining related loss of habitat would not occur. Short-term habitat reductions would be limited to visitor disturbance along access routes and around disturbed sites during NPS reclamation. The duration of long-term effects from past mining would be the shortest of any of the alternatives.

Summary. This alternative would have the least impact on the peregrine falcon prey habitat in the two study areas. Although a long-term loss of 897 acres of habitat has occurred from past mining activities, no further mining, related habitat reductions, or nonmining use of patented claims would occur. The NPS would acquire all claims and reclaim disturbed areas. The duration of long-term impacts from past mining activities would be shorter than for any of the other alternatives.

Table 32. Peregrine Falcon Prey Habitat Loss Under Alternative D in the Yukon-Charley Rivers National Preserve, Alaska

	LONG-TERM IMPACTS (ACRES)			SHORT-TERM IMPACTS (ACRES)	
Study Area Drainage	Past Mining Loss	Alternative D Loss	Cumulative Loss	Alternative D Loss	Cumulative Loss
Woodchopper	126	0	126	0	126
Coal	705	0	705	0	705
Sam	10	0	10	0	10
Total	841	0	841	0	841
Fourth of July	56	0	56	0	56
Grand Total	897	0	897	0	897

IMPACTS ON VISUAL QUALITY

Woodchopper/Coal/Sam Creek Study Area. Since little or no disturbance occurred before mining, the entire 145,943 acres in the study area was considered to be pristine prior to any mining disturbance. Past mining activity has altered a total of 1,116 acres in the study area, reducing the amount of natural appearing landscape by 0.76 percent (table 33).

Areas that have been altered by past mining are noticeably different than the surrounding landscape. The appearance of disturbed areas ranges from completely barren landscapes composed of unvegetated dredge-spoil piles to areas that have been revegetated to various degrees, mostly in vegetative compositions that contrast with the surrounding natural environment.

Cumulative Impacts - Under this alternative, further impacts on visual quality would not occur. The total long-term impact on visual quality would remain 1,186 acres, or 0.80 percent of the pre-mining total. Thus, 99.2 percent of the study area acreage would remain in a naturally appearing condition. The National Park Service would acquire all claims and reclaim disturbed areas. This would decrease recovery periods for sites disturbed during past mining activities and shorten the duration of long-term impacts.

The majority of current visitors to the preserve are not affected by areas of past mining disturbance. The only disturbance that is readily visible from the Yukon River, the primary recreational corridor, is at the mouth of Coal Creek. At this location, a cabin, a barge unloading site, and some revegetated tailing areas can be seen. The mined areas' greatest scenic impacts are viewed from the air by passengers in small planes sightseeing or flying over the area.

Conclusion - The reductions in visual quality that have occurred during past mining do not represent a major impact. Additional mining related or nonmining impacts on visual quality would not occur under this alternative.

Fourth of July Creek Study Area. Past mining activity has altered a total of 80 acres in this study area (30,598 acres) and reduced the amount of natural appearing landscape by 0.26 percent (table 33). Areas that have been impacted by past mining are noticeably different than the surrounding landscape. The appearance of disturbed areas ranges from completely barren landscapes composed of unvegetated dredge-spoil piles to areas that have been revegetated to various degrees, mostly in vegetative compositions that contrast with the surrounding natural environment.

Cumulative Impacts - Under this alternative, no further impacts on visual quality would occur. The total long-term impact on visual quality would remain 80 acres, or 0.26 percent of the premining total. Thus, 99.74 percent of the study area acreage would remain in a naturally appearing condition. The National Park Service would acquire all claims and reclaim disturbed areas. This would decrease recovery periods for sites disturbed during past mining activities and shorten the duration of long-term impacts.

The majority of current preserve visitors are not affected by the mining-caused landscape disturbance in the Fourth of July Creek watershed. Most of the disturbance lies 5 or more miles from the Yukon River and is out of view. The mined areas' greatest scenic impacts are viewed from the air by passengers in small planes either sightseeing or flying over the area.

Conclusion - The reductions in visual quality that have occurred during past mining do not represent a major impact. Additional mining related or nonmining impacts on visual quality would not occur under this alternative.

Summary. This alternative would have the least impact of any of the alternatives on the visual quality in the two study areas. Although a long-term impact of 1,196 acres of vegetative disturbance has occurred during past mining activities, further mining-related impacts on visual quality would not occur. The National Park Service would acquire all claims and reclaim disturbed areas. The duration of long-term impacts from past mining activities would be shorter than for any of the other alternatives.

Table 33. Impacts of Alternatives D on Visual Quality in the Yukon-Charley Rivers National Preserve, Alaska

	UNDISTURBED LANDSCAPE		LONG-TERM IMPACTS (ACRES)			
Study Area Drainage	Pre-Mining	Existing (% premining)	Past Mining Loss	Alternative Loss	Cumulative Loss	Percent Loss
Woodchopper	47,025	46,899	337	0	337	0.72
Coal	53,574	52,869	769	0	769	1.44
Sam	45,344	45,334	10	0	10	0.02
Total	145,943	145,102	1,116	0	1,116	0.76
Fourth of July	30,598	30,542	80	0	80	0.26
Grand Total	176,541	175,644	1,196	0	1,196	0.68

IMPACTS ON CULTURAL RESOURCES

Under alternative D, cultural resources are more likely to be preserved and protected than under any of the previous alternatives. However, the additional regulatory and fiscal responsibilities of the National Park Service, for preservation of eligible historic properties, would require revisions of cultural resource management plans and the commitment of the needed agency resources.

IMPACTS ON SUBSISTENCE/SECTION 810 EVALUATION

The overall pattern of subsistence resources use in the region of Yukon-Charley Rivers National Preserve is given in the affected environment section. Alternative D would require the National Park Service to acquire all patented and valid unpatented mining claims in the preserve. The Service would develop an acquisition plan for established claims and undertake validity determinations for all unpatented claims not already examined which would benefit the subsistence environment.

Alternative D assumes that mining would not occur; the National Park Service would acquire all patented and valid unpatented mining claims. No mining means no change from existing conditions and thus no impacts or restrictions on subsistence uses under this alternative.

Conclusion. There would be no impacts on the subsistence uses of resources under alternative D.

IMPACTS ON WILDERNESS VALUES

Under alternative D, additional mining related impacts on wilderness values would not occur. All mining claims would be acquired by the National Park Service. The National Park Service would reclaim some disturbed areas, which would reduce recovery periods.

Cumulative Impact. The total cumulative impacts to wilderness values are composed of both past impacts and future impacts predicted under this alternative. According to the proposed alternative in the FEIS for wilderness recommendation (NPS 1988), both the Woodchopper/Coal/Sam Creek and the Fourth of July Creek study areas would not be designated as wilderness due to existing development, tailings piles, mining claims, as well as the numerous mining trails in the area. Past mining disturbance within the two study areas would continue to impact wilderness values long into the future. Further reduction in wilderness values or nonmining use of patented claims would not occur under this alternative. Disturbed areas would eventually revert to naturally appearing conditions and recover wilderness values. NPS reclamation of some acquired mined areas would help speed recovery of wilderness values. Undeveloped mining claims would remain in a natural state.

Conclusion. Past mining activities have had an impact on wilderness values in large portions of the Woodchopper/Coal/Sam Creek and Fourth of July Creek study areas. Under this alternative, no additional mining and nonmining development impacts on wilderness values would occur. NPS reclamation of disturbed areas would result in the shortest wilderness values recovery period of any of the alternatives. Compared to the other alternatives, alternative D would have the least impact on wilderness values in the two study areas.

IMPACTS ON RECREATION AND VISITOR USE

Under alternative D, existing patented and unpatented claims would be acquired and mining would be phased out. Disturbed areas that are acquired would be reclaimed by the Nation Park Service, which could result in shorter site recovery periods and a reduced duration of long-term effects.

Implementation of this alternative would make the Woodchopper/Coal/Sam Creeks and the Fourth of July Creek study areas more attractive for the majority of visitors who use the area for natural recreational purposes. Natural resources in the preserve are more likely to be preserved and protected under this alternative than under any of the other alternatives.

Hunting, sightseeing, hiking, and camping would benefit the most from the elimination of mining. In the long term, wildlife habitat would return to natural conditions and wildlife would return to previously mined areas which would consequently improve hunting and wildlife viewing opportunities in the area. Likewise, natural qualities, wilderness values, and opportunities for solitude would return in the long term under this alternative.

On the other hand, the cessation of the placer mining activities, that would occur under the conditions of this alternative, would eliminate the opportunity for visitors to observe active placer mining in the two study areas which is thought to be a growing recreational use.

Under this alternative, all mining claims would be acquired by the National Park Service. Nonmining developments on patented mining claims, such as cabins, subdivisions, or commercial lodges, would not occur. This would decrease potential recreational use of the area as well as limit the types of recreational use that may otherwise occur under the other alternatives.

Cumulative Impact. The total cumulative impact on recreational use and quality results from adding the past impacts and the future impacts that are predicted under this alternative. In general, recreational use in the preserve and in the two study areas is relatively light. The quality of most recreational pursuits would increase under this alternative. Recreation and visitor use have been slightly affected by surface disturbances associated with past mining operations such as the removal of overburden, the formation of settling ponds, and the loss of vegetation which have affected the area's natural setting. Hunting, sightseeing, and opportunities for solitude would most benefit from the elimination of mining by decreasing potential surface disturbances, visual and aural effects, and increased human activity.

Conclusion. Under this alternative, no further reduction in the quality of recreational opportunities would occur. Although past mining activity had limited impacts to recreational quality, the quality of certain recreational activities would increase under this alternative. Hunting and backpacking would benefit the most under the conditions of this alternative. The number of recreational participants in the two study areas would continue to be limited due to limited overall preserve usage. The use of claims for other recreational purposes would no longer be possible under this alternative.

IMPACTS ON LOCAL ECONOMY

Alternative D would eliminate mining activities in the two study areas. As a basis of comparison, it is necessary to utilize the expected economic activity that would be expected under the conditions of alternative A. Therefore, the acquisition of all mining claims in the Woodchopper/Coal/Sam Creek and the Fourth of July Creek study areas would eliminate up to 16 mining related jobs, $153,000 in total expenditures, and up to $23,250 in expenditures to the local communities in and around the preserve.

Employment in other sectors of the economy that would have given support to the mining operations in the study area would also be affected (e.g., employment in transportation, retail sales, manufacturing, and government).

When claimants are compensated for their mining claims, it could be expected that employment in other sectors of the economy would be generated. The gross value estimate for mining claims in Yukon-Charley is approximately $3,500,000 to $5,500,000. The overall effect of the compensation for mining claims should not be overestimated, however, because most of the capital would not remain in the local economies due to the fact that most mining claim owners do not typically live in the immediate vicinity of the preserve.

Acquiring all claims would also eliminate the potential of other uses occurring on patented claims such as cabin sites and lodges. The elimination of these potential uses would also eliminate economic activity in the local communities that may be generated from these uses.

Cumulative Impact. The total cumulative impact of mining on the socioeconomic environment results from adding the past impacts and the future impacts that are predicted under this alternative. Past mining activities in the preserve have had an effect on the economics of the local communities. In addition to direct employment, expenditures made by the mining operations for such things as equipment, fuel, and supplies has played an important role in the economy of most of the local communities.

Under this alternative, the elimination of mining activities would remove mining related revenues from the economies of the local communities near the preserve, through the elimination of up to sixteen jobs and $23,250 in expenditures. The money paid to claimholders would generate some economic activity in the short term, but to the local communities this would be relatively minor in comparison to the expected mining expenditures under alternative A.

Conclusion. Acquiring all mining claims in the study areas would eliminate all mining activities, a source of employment in and around the Yukon-Charley National Preserve. All mining related employment opportunities and expenditures would likewise be eliminated. This impact on the local communities would not be major. Other employment opportunities and related economic activity that may otherwise occur on these claims would also be eliminated. The loss in revenue to local economies could be somewhat offset if capital paid to claimants for claim acquisition is expended locally.

Impacts on NPS Mineral Management Program Administration

Management of mining and mineral development activities has increased administrative costs associated with the NPS mineral management program. This program currently employs 20 to 25 people in the NPS Alaska

Regional Office, Wrangell-St. Elias, and Denali National Park and Preserves. Major mining and mineral management program activities include plan of operations review and analysis, environmental compliance, validity examinations, claim boundary surveying, claim resource data collecting, operation monitoring and enforcement, and reclamation.

Under alternative D, program administration costs would not change due to the potential to the NPS reclamation of disturbed areas on acquired mining claims and the need to perform validity appraisals. Reclamation would be a long-term cost associated with the mineral management program.

Conclusion. Administration of the NPS Alaska mineral management program would not be affected by this alternative for the immediate future.

IMPACTS ON PALEONTOLOGICAL RESOURCES

Under alternative D, no additional mining related disturbance of stratified deposits and contained paleontologic material would occur. All claims would be acquired by the National Park Service, and nonmining impacts on paleontological resources would not occur.

Cumulative Impacts. The total cumulative impacts to paleontological resources are composed of both past impacts and impacts predicted under this alternative. Past mining activity has disturbed 1,116 acres in the Woodchopper/Coal/Sam Creek study area and 80 acres in the Fourth of July Creek study area. Impacts on paleontologic resources within the disturbed areas include the loss or alteration of stratified deposits and contained paleontologic material. The scientific value of lost or modified deposits is unknown.

Compared to the other alternatives, alternative D would have the least impact on paleontological resources in the two study areas.

Conclusion. Past mining impacts have caused the loss and alteration of paleontological resources with unknown scientific value. Under this alternative, no additional mining and nonmining development impacts on paleontological resources would occur.

IMPACTS OUTSIDE THE STUDY AREA

The focus of this document is the analysis of the cumulative effects of past and future mining activity. In Yukon-Charley Rivers National Preserve, mining and related activities have occurred outside the Woodchopper/Coal/Sam Creek and Fourth of July Creek study areas. Future nonmining impacts outside of the study area could also occur regardless of the EIS alternative selected.

Location of known mine sites and disturbance are illustrated in the mining outside the study areas map (affected environment). Some mine sites were not included on this map because their exact location was unknown. See the affected environment section for a description of past mining and related activities outside the two study areas. These areas are mostly confined to the Charley River, Nation River, Flume Creek, Washington Creek, and Weber Creek drainages. Past mining activities within these drainages have caused very minor modifications to the terrain, vegetation, and stream channels. These minor modifications have not resulted in measurable impacts to any of the target resources. There are no mining claims located outside of the two study areas; therefore, no new mining will occur.

MITIGATION

Mitigation refers to a class of actions which have the purpose of counteracting the effects of disruptions on the natural environment associated with the proposed action. The CEQ guidelines (40 CFR 1508.2) define mitigating actions to include reducing or eliminating parts of the action, repairing damages, instituting management practices over the life of the project, or substituting or replacing damaged resources or environments.

Under alternatives A, B, and C, during NPS review, if it is determined that a proposed mining plan would result in impacts that violate decision standards, site-specific mitigation alternatives would be investigated. If only minor impacts required mitigation, altering and/or restricting the timing, location, and/or extent of mineral development may be required to avoid or reduce the impacts to an acceptable level. Major impacts may require substantial reclamation procedures such as re-establishing topographic contours to approximate original contours, re-establishing original stream gradients, pool/riffle ratios, and sinuosity, saving and redistributing top soil, and possibly revegetating disturbed sites. Contingency mitigation plans for unforeseeable impacts, such as toxic material spills, will be developed and predetermined as part of an approved plan.

Since no further mining-related impacts to preserve resources would occur under alternative D, no mitigation would be necessary. Past mining impacts would be mitigated on some disturbed sites through NPS reclamation procedures.

CONSULTATION AND COORDINATION

CONSULTATION AND COORDINATION

SCOPING

The formal scoping process was initiated on May 7, 1986 when the National Park Service published in the Federal Register its intent to prepare environmental impact statements for three parks in Alaska (51 FR 16903). The notice also announced the intention to hold scoping meetings with interested parties and encouraged the public to submit comments on the issues to be addressed by the EISs.

In addition to the Federal Register notice, the National Park Service issued a news release to local papers in the Anchorage and Fairbanks areas, announcing its intent to prepare the EISs and conduct scoping meetings.

On May 15, 1986 a letter was sent to approximately 862 interested organizations, groups, individuals and local, state and federal agencies requesting comments on the scope of the analysis, issues to be addressed by the EISs, and any information on cumulative effects methodology or studies.

Two rounds of scoping meetings where held. The first round was held in September 1986 in Anchorage, Fairbanks, and Eagle, Alaska to identify major issues to be addressed in the EISs. Following these meetings a scoping summary was prepared and sent to all participants.

The second round of scoping meetings was held in March 1988 in Anchorage and Fairbanks to help define an appropriate range of alternatives to be discussed in the documents. In addition, an EIS alternatives brochure was mailed to all interested organizations, groups, individuals, and government agencies requesting input on the following alternatives and any additional alternatives that the National Park Service should evaluate.

Alternative A - The National Park Service would manage mining activities on patented and valid unpatented claims according to existing regulations at 36 CFR 9A and other state and federal permitting requirements. Mining plans of operations would be processed on a case-by-case basis evaluating individual effects but without considering cumulative effects.

Alternative B - The National Park Service would manage mining activities on patented and valid unpatented claims according to existing regulations at 36 CFR 9A and other state and federal permitting requirements. An evaluation of the cumulative effects of individual mining operations would be conducted on all mining plans of operations.

Alternative C - The National Park Service would develop and implement an acquisition plan for all patented and valid unpatented mining claims. Additional plans of operations would not be approved; existing operations would continue only for the period of the approved plan. The National Park Service would conduct validity examinations on all unpatented claims and initiate contests or include the claims in the acquisition plan as appropriate.

Alternative D - This alternative is similar to alternative B, but it would also establish surface use and patent restrictions for mining claims. The United States would retain title to land in the mining claim and only the mineral deposits would be patented. All future mineral patents would limit the use of surface resources to purposes necessary for mineral activity. For existing claims patented without restrictions, an acquisition plan would be developed to acquire the surface estate, while reserving to the mineral owner reasonable use of the surface of the land for mining purposes.

Alternative E - The National Park Service would not process mining plans of operations, nor take any other action under its regulations governing mining activities.

Significant Issues Raised During Scoping

The issues raised during scoping are listed herein. Preliminary drafts of this document were reviewed by the U.S. Fish and Wildlife Service and the U.S. Army Corps of Engineers in their role as cooperating agencies. Issues raised, but not addressed in this EIS, are listed along with the reason why they were not included.

Issues Addressed by the EIS

Hydrologic changes
Fisheries habitat
Arctic grayling
Water quality
Impacts on wetlands
Aquatic ecosystem integrity
Long-term and short-term impacts
Nonmining uses of patented claims
Reclamation
Wildlife habitat
Peregrine falcon
Threatened and endangered species
Criteria for cumulative effect analysis
Impact thresholds
Magnitude of impacts
Impacts from past mining operations
Economic impacts
Access
Impacts from access
Impacts on subsistence
Heavy metals contamination
Abandoned mine lands
Impacts to scenic values
Impacts on visitor use
Administrative costs for mining claims
Acquisition costs of mining properties
Wilderness

Issues Dismissed During Scoping

Water Quality Standards. Concerns were raised over existing water quality standards. The National Park Service does not set these standards as they are the responsibility of the EPA and each state. NPS regulations at 36 CFR 9.9(b)(7) require, at a minimum, compliance with the existing standards. It is not within the scope of this EIS to assess the adequacy of existing state and federal water quality standards. Water resource protection measures and operating stipulations for approved mining plans of operations are presented in appendix 14.

Alternative Technologies. It is not a responsibility of the National Park Service to develop or require specific alternative mining technologies. That task lies more appropriately with those state and federal agencies responsible for managing mineral lands and assisting the mining industry in the economic development of mineral resources. The National Park Service is responsible for resource preservation and the protection of park values which are the focus of this EIS. Once the requirements for environmental protection are defined, the individual mine operator will determine how to meet those requirements.

Mineral Assessments Under Section 1010 (a) of ANILCA. Several issues were raised regarding the Alaska Mineral Resource Assessment Program (AMRAP) of ANILCA. This program is overseen by the U.S. Geological Survey and not the National Park Service. Specific guidelines and regulations regarding implementation of this program have not been developed. Access to NPS units for mineral assessments is allowed under the conditions defined in Section 1010 of ANILCA. AMRAP does not have an affect on the permitting actions of the National Park Service on valid existing mining claims and is not considered in this EIS.

Revised Statute 2477 Rights-of-way. Many people were concerned over the issue of access and specifically Revised Statute (RS) 2477 rights-of-way. The evaluation of these right-of-way issues is not within the scope of this EIS. ANILCA, Title XI and its implementing regulations at 43 CFR Part 36, affirmatively provides for adequate and feasible access to inholdings regardless of an RS 2477 settlement issue and is therefore not an issue for this document.

Response to EIS Alternatives Brochure

The National Park Service distributed 1,250 copies of the EIS alternatives brochure in March 1988. A total of 71 responses were received. An analysis of the input received indicates that of the five alternatives (see above), 3 respondents favored alternative A; 2 respondents favored alternative B; 32 respondents favored alternative C; 4 respondents favored alternative D; and 1 respondent favored alternative E. Another 19 respondents suggested other alternatives including land exchanges, revision of the NPS mining regulations, and removal of mining claims from NPS jurisdiction. Ten respondents expressed no preference for any alternative. A discussion of other alternatives considered but eliminated from further analysis is presented in chapter 2, Alternatives Including the Proposed Action.

The scoping summary from the first scoping sessions, the responses to the EIS alternatives brochure, and all other written comments received during the scoping process and the preparation of the EIS are on file at the

Alaska Regional Office, National Park Service
2525 Gambell Street, Anchorage, Alaska

CONSULTATION WITH AGENCIES AND ORGANIZATIONS

The EIS teams received literature or information from several agencies and private organizations during the preparation of this EIS. Preliminary drafts of this document were reviewed by the U.S. Fish and Wildlife Service and the U.S. Army Corps of Engineers in their role as cooperating agencies.

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DISTRIBUTION OF THE EIS FOR PUBLIC/AGENCY REVIEW

Approximately 250 copies of this environmental impact statement were sent to the Alaska congressional delegation, government agencies, native corporations, organizations, businesses, and individuals for review. In addition, 700 notices were mailed out to notify all parties on the unit's mailing list and media organizations of the availability of this document for public review. Copies of this document were also sent to libraries to maximize public availability to the fullest extent possible. All respondents to this draft EIS will be identified in the final environmental impact statement.

Alaska Congressional Delegation

Senator Frank H. Murkowski
Senator Ted Stevens
Representative Don Young

Federal Agencies

- Advisory Council on Historic Preservation
- Department of Agriculture
  - Forest Service
  - Soil Conservation Service
- Department of Commerce
  - National Marine Fisheries Service
  - National Oceanic and Atmospheric Administration
- Department of Defense
  - Corps of Engineers
- Department of Energy
- Department of the Interior
  - Bureau of Indian Affairs
  - Bureau of Land Management
  - Bureau of Mines
  - Fish and Wildlife Service
  - Geological Survey
  - Minerals Management Service
  - Office of Environmental Project Review
  - Office of the Solicitor
- Department of Justice
- Department of Labor
  - Mining Safety and Health Administration
- Department of Transportation
  - Federal Aviation Administration
  - Federal Highway Administration
- U. S. Environmental Protection Agency

Federal-State Agencies

Alaska Land Use Council

Alaska State Agencies

Alaska State Historic Preservation Office
Attorney General for the State of Alaska
Citizens Advisory Commission on Federal Areas
Department of Commerce and Economic Development
Department of Community and Regional Affairs
Department of Environmental Conservation
Department of Fish and Game
Department of Health and Social Services
Department of Labor
Department of Law
Department of Natural Resources
Department of Policy Development and Planning
Department of Public Safety
Department of Revenue
Department of Transportation and Public Facilities
Office of the Governor, Division of Governmental Coordination
University of Alaska

Canada/International

International Boundary Commission
Parks Canada

Local Agencies and Native Corporations

Alaska Federation of Natives
Ahtna, Incorporated
Municipality of Anchorage
City of Eagle
City of Fairbanks
Doyon, Limited
Fairbanks-North Star Borough
Hungwitchin Village Corporation
Matanuska-Susitna Borough
Tanana Chiefs Conference

Organizations

Alaska Miners Association
Alaska Mining Commission
Alaska Wildlife Alliance
Denali Citizens Council
Glacier Bay Science Board
Miners Advocacy Council
National Audubon Society

National Parks and Conservation Association
Northern Alaska Environmental Center
Pacific Legal Foundation
Placer Miners of Alaska
Resource Development Council
Sierra Club
Sierra Club Legal Defense Fund
Soil Conservation Society
Trustees for Alaska
Wilderness Society

NOTE: A complete list of the organizations, businesses, and individuals receiving this EIS is available from the National Park Service, Alaska Regional Office.

pages tightly bound

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APPENDIXES

APPENDIX 1. RESOURCE PROTECTION GOALS

Introduction

To assist in the impact analysis of this document, resource protection goals were developed and used. Goals were only used as one of the tools used in analyzing the cumulative impacts of alternatives B and C. Resource protection goals are established to prevent or minizing damage to target resources from the cumulative effects of mining. The resource protection goal is a percentage of the premining condition that the National Park Service will attempt to return to or maintain to protect the resource. The resource protection goals reflect resource requirements and NPS mandates and authorities in Alaska.

RESOURCE PROTECTION GOALS FOR RESOURCES ANALYZED QUANTITATIVELY

Resource Protection Goals for Aquatic and Wildlife Resources

Major NPS concerns relative to establishing resource protection goals for aquatic ecosystem and wildlife habitat resources are found in the park/preserve's enabling and other legislation. These mandates emphasize preserving and conserving ecological processes, and natural and healthy fish and wildlife populations and habitats. The intent of the NPS Organic Act (PL 64-235) of managing NPS units to preserve and conserve natural resources was reaffirmed by Congress in 1978, which further stated that:

> "The authorization of activities shall be construed and the protection, management, and administration of these areas shall be conducted in light of the high public value and integrity of the National Park System and shall not be exercised in derogation of the values and purposes for which these various areas have been established" (16 US Code 1a-1).

The National Park Service (NPS) has the responsibility of protecting the values for which Yukon-Charley Rivers National Preserve was created, and the resource protection goals should reflect these values and ensure the preservation of natural processes, and natural and healthy fish and wildlife populations and habitat. Preservation of the diversity and abundance of wildlife species in Yukon-Charley Rivers National Preserve were reasons for the perserve's establishment. The theme for preserving the wildlife resources of Yukon-Charley was mandated by ANILCA (PL 96-487) in 1980, which stated that the preserve would be managed,

> . . . to protect habitat for, and populations of fish and wildlife, including, but not limited to, the peregrine falcons and other raptorial birds, caribou, moose, Dall sheep, grizzly bears, and wolves . . . (Sec. 201 [10]).

The importance of managing NPS units for ecological processes and natural ecosystems is stressed in the NPS Management Policies (1978), which state that, in parks permitting various resource uses, such as mining,

> ". . . resource management must seek to avoid unnecessary . . . interference with natural processes . . . Such management [of animal populations] . . . will strive to maintain the natural abundance, behavior, diversity, and ecological integrity of native animals in natural portions of parks as part of the park ecosystem, . . . relying on natural processes to regulate populations of native species to the greatest extent possible."

The Policies further state that "the concept of perpetuation of a total natural environment or ecosystem . . . is a distinguishing aspect of the Service's management of natural lands." (Emphases added.)

ANILCA (Sec. 815[1]) further mandates the NPS to "conserving natural and healthy populations of fish and wildlife within national parks and monuments and healthy populations of fish and wildlife within national preserves." A Senate committee report (96-413) from ANILCA's legislative history defines the phrase "the conservation of healthy populations of fish and wildlife" to mean:

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> "the maintenance of fish and wildlife resources and their habitats which (1) assures stable and continuing natural populations and species mix of plants and animals in relation to their ecosystems . . .; (2) minimizes the likelihood of irreversible or long-term adverse effects upon such populations and species; (3) and ensures maximum practicable diversity of options for the future." (Emphasis added.)

It further states that, "the greater the ignorance of the resource parameters, particularly of the ability and capacity of a population or species to respond to changes in its ecosystem, the greater the safety factor must be."

The dynamics of natural processes in subarctic ecosystems are complex, and the impact of human perturbations on these natural processes and ecosystems is often unpredictable and long-lasting. For example, the duration of long-term impacts to vegetation cannot be accurately predicted due a lack of vegetative recovery data, as well as lack of information on a number of mining variables involved. Such variables include the type, location, and elevation of mining activity; soil types including presence or absence of permafrost, etc. Past subarctic studies have estimated that a minimum of 20 to over 100 years are required for disturbed mining areas to return to premining levels of wildlife use (Singleton et al. 1978; NPS, Kertell 1984). Even with returned levels of wildlife use, plant species composition or diversity in revegetated areas may not be the same as those under premining conditions. Furthermore, numerous studies have illustrated how complex and damaging cumulativae impacts of human disturbances on natural resources can be and how difficult it is to predict these impacts (e.g., Harris 1988).

Establishment of resource protection goals for aquatic and wildlife resources is based on the objective of preserving the ecological health or integrity of ecosystems and their component species. Ecosystem integrity depends upon the ability of the species to interact in the environment to maintain the structure and function of the ecosystem. Natural ecosystems evolve over time to sustain a group of species that can coexist in dynamic balance. In a healthy ecosystem, this balance of species and habitat types fluctuates over time. Natural ecosystems have the capacity to maintain ecosystem integrity during various environmental conditions that have occurred during evolution of species in the ecosystem. When determining the risk of a particular environmental perturbation to ecosystem integrity, both the frequency of occurrence and magnitude of the perturbation must be considered.

Ecosystems can best maintain integrity when environmental conditions closely resemble the most frequent conditions that occurred over the evolutionary period. The species of an ecosystem have more opportunities to adapt to frequent disturbances, and conversely, they have fewer opportunities to adapt to infrequent perturbations. Thus, the integrity of an ecosystem is at greater risk the further conditions are from those experienced by the ecosystem while its species were evolving.

When humans cause an environmental perturbation, it increases the frequency of occurrence of that perturbation above the natural frequency. The more severe the perturbation, the greater the likelihood that it will seriously impact the integrity of the ecosystem.

In addition to interpreting mandates, regulations, and management policies, establishing the resource protection goals also involves examining and considering how a target resource is generally affected by disturbance. However, area-specific knowledge of these effects based on ecological processes and historical recovery trends is limited. Specialists familiar with the resources and park areas interpreted the information presented in the above sections to establish the resource protection goals.

Strictly interpreted, "natural" fish and wildlife populations and habitats should remain unaltered and unperturbed; but a no-impact goal is unrealistic when considering any land use activity, including mining. A certain amount of impact must be allowed for mining to occur.

Nevertheless, the resource protection goals established for aquatic and wildlife resources are conservative to allow natural processes to continue with the least amount of interference. Differences in values among the goals reflect differences in the response of the different resources to human perturbation.

Adequate data do not exist for the Yukon-Charley Rivers National Preserve area to computationally derive or extrapolate resource protection goals. Therefore, a careful consideration of all available data and ecological principles was required to arrive at goals consistent with the legislative mandates, regulations, and NPS management policies.

Both long- and short-term significance determinations were made for riparian wildlife habitat and aractic grayling habitat. The long-term goals for riparian wildlife habitat assume long-term habitat loss due to vegetative disturbance. The short-term goals assume short-term habitat loss due to displacement of animals from mining sites during times of active operations.

The effect on the population level of a species from a given long- or short-term loss and/or degradation of a species' primary habitat in a study area is unknown. However, it is considered that losses greater than those represented by the resource protection goals would prevent the maintenance of natural and healthy populations or habitats; would prevent the maintenance of the natural abundance or, behavior, or ecological integrity of the species as part of the park/preserve's ecosystem; or would prevent the perpetuation of a total natural environment or ecosystem. Aquatic ecosystems are highly dynamic and resilient in comparison to terrestrial ecosystems (Odum 1977). This allows them to maintain their integrity under relatively adverse conditions.

Resource protection goals are presented as the units of a resource that are desired in the study area, expressed as a percentage of the number of units which existed before mining took place.

Resource protection goals for aquatic and wildlife resources established for this EIS are:

Table 1. Resource Protection Goals for Alternatives B and C for Target Resources Analyzed Using the Cumulative Impact Methodology

Target Resource	Long-term RPG (%)	Short-term RPG (%)
Arctic Grayling Habitat	90	90
Riparian Wildlife Habitat	99	90

CRITERIA FOR RESOURCES QUALITATIVELY ANALYZED

VISUAL QUALITY

NPS mandates, policies, and regulations were the basis for analyzing impacts on visual quality in Yukon-Charley Rivers study areas. A common goal of these laws is to preserve and conserve the scenic qualities of the park and preserve.

One of the purposes of the NPS as mandated by its National Park System Organic Act (PL 64-235) is to ". . . conserve the scenery . . . [and] to provide for the enjoyment of the same in such manner and by such means as will leave [it] unimpaired for the enjoyment of future generations."

The need to protect the visual quality even in areas of parks subject to other resource uses, such as mining, was stipulated by the NPS Management Policies in 1978. "Even in such areas, resource management must seek to avoid unnecessary alteration of the natural scene . . ."

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Regulations promulgated from the Mining in the Parks Act (36 CFR 9A) stipulate that plans of operation would not be approved that would "preclude management of the unit for the purpose of preserving the pristine beauty of the unit for present and future generations," or that would "constitute a nuisance in the vicinity of the operation," which would result in an annoyance or disturbance that interferes with visitor enjoyment. Altering the visual quality would interfere with visitor enjoyment.

RECREATION AND VISITOR USE

In general, an analysis of the cumulative impacts of mining on recreational use or quality is based upon the same legislative mandates, established regulations, and NPS policies used for other target resources. The goal is to provide for freer use and enhanced quality of recreational and visitor use in the study area.

WILDERNESS VALUES

In general, the goal is to avoid or minimize cumulative impacts of mining wilderness values. Criteria used to evaluate impacts on wilderness values are best expressed in section 2(c) of the Wilderness Act of 1964 (Public Law 88-577). The contents of this section are discussed under the "Wilderness Values" subsection of the "Affected Environment" chapter.

LOCAL ECONOMY

Analysis of mining impacts on the local economy is not based on mandates, regulations, or policies. Instead, the analysis is based on the economic effect of mining on the economies of the local communities in a "typical" year. A base year for each study area or park unit is discussed in the affected environment chapter and is used in the environmental consequences chapter to compare employment and expenditures. For mining impacts to the local economies, the goal is to avoid a change of greater than or less than 25 percent from the amount projected in the base year of analysis. A large variation from "typical" expenditures is built into this analysis because there are so many variables in the determination of expenditures to the local communities (such as price of gold, proximity of local communities, and length of mining season).

APPENDIX 2. THE CUMULATIVE IMPACT METHODOLOGY

This appendix describes the procedures used in this EIS for quantitatively determining cumulative impacts. Target resources analyzed quantitatively with the cumulative impact methodology were arctic grayling habitat and riparian wildlife habitat.

STEPS FOR DETERMINING THE CUMULATIVE IMPACT

- **Target resources were selected.** Target resources were selected for analysis from major issues identified in the EIS scoping process. Target resources are resources that can be directly, indirectly, or cumulatively affected by mining.

- **Target resource study areas were determined.** Contiguous watersheds containing claims with a likelihood of mining activity in the foreseeable future or major past mining disturbance were defined as study areas (see this appendix, section II) .

- **Environmental variables for each target resource were selected.** Environmental variables are attributes of a target resource used to measure the cumulative impact on the target resource. The selection of the environmental variables was based on whether the variables affected the target resource, whether they were essential to the well-being of the target resource, whether the variables were measurable, and whether data existed for the variable.

- **Procedures were developed to estimate the cumulative impact on each target resource.** Additive, cumulative impact evaluation procedures were developed for each target resource to assess the amount of change caused by mining. These assessment procedures were used to estimate premining conditions, to add future mining impacts to past mining impacts, and to sum all impacts on a given resource throughout the study area(s).

STUDY AREAS

Procedures for establishing study areas.

- **Areas were identified with the potential for future mining.** The focus for establishing study areas was claim groups identified in the mineral development scenario with a probability of mining activity in the foreseeable future. These areas were mapped.

- **Contiguous watersheds containing these claims were combined.** Watersheds formed the basic units of the study areas. Contiguous watersheds containing scenario claim groups or major past mining disturbance were combined.

Assumptions and rationale for basing a determination of significance on study areas.

- NPS units are unique, highly valued, and nationally significant.

- The establishment of study areas is based on the premise that each NPS unit consists of a highly complex mosaic of subunits (definable in a number of reasonable ways), each highly valued and individually important.

- The combination of these unique subunits gives rise to the larger unit's national significance, and any degradation of a subunit would reduce the larger unit's overall value and national significance. The degradation of certain subunits cannot be compensated for by adjusting the importance or value of other subunits.

Mining impacts on resources have the potential to adversely alter the natural condition of resources to the point where the values for which the unit was established would be degraded. To adequately assess impacts in the mining zone of influence, or the subunit affected by mining, study areas were defined in areas with major past and potential future mining activity. The boundary of a study area is the line beyond which the impact of mining cannot be estimated.

FISH HABITAT CUMULATIVE IMPACT PROCEDURE

The procedure for evaluating the cumulative mining impacts to fish habitat was to estimate the change in habitat using the USFWS Habitat Evaluation Procedure (HEP) (USFWS 1980, 1981). HEP is a standardized methodology for estimating environmental impacts on habitat for selected species of fish and wildlife. This method measures habitat quality for selected evaluation species with an index, the Habitat Suitability Index (HSI). This value is derived from an evaluation of the ability of key habitat components to supply life requisites for selected species. HSI values are obtained for individual species through the use of documented habitat suitability models employing measurable key environmental variables. The HSI values are multiplied by area (acres) of available habitat to obtain Habitat Units (HUs) for individual species. Habitat Units serve as the principal unit of comparison, integrating both habitat quality and quantity of habitat. The identified changes in habitat quality and quantity provide the basis for comparing the effects of the alternatives on the evaluation species.

The fish resource selected for impact evaluation was the arctic grayling habitat. This species was chosen because it is the most abundant fish species in the study streams, it is important to sport and subsistence fishing in the preserve, and information is available on grayling habitat requirements. The U.S. Fish and Wildlife Service (1985) has published a HSI model for arctic grayling. Arctic grayling life history and habitat requirements were described in this document and by the ADF&G (1985).

Selecting Environmental Variables

Thirteen environmental variables in three categories were selected to assess the effects of mining on arctic grayling habitat (map 1). The source of environmental variable data is from the 1986 NPS water quality and fishery survey, the 1978 National Uranium Resource Evaluation water sample data (DOE 1981), and the 1988 Yukon-Charley Rivers National Preserve GIS database.

In 1986, water quality and stream habitat data was collected at 22 sites on the study area streams. Water samples were collected for the DOE in 1978 at 63 stream sites. Sample sites were located downstream, within, and upstream of existing disturbance. Turbidity (V_1) was measured using a Hach Model 2100A Turbidimeter calibrated with Hach Gelex secondary turbidity standards which were compared to formazin primary standards. PH (V_2) of the 1986 water samples was measured using a Hach color comparison wheel. For the 1978 samples, pH was measured using a portable pH meter. Metal concentrations (V_3) in the 1986 samples were measured using inductively coupled plasma (ICP) emission spectrometry by the Chemical and Geological Laboratories of Alaska, Inc. Metal concentrations in the 1978 samples were determined using plasma source emission spectrometry by the National Uranium Resource Evaluation Project at the Union Carbide Oak Ridge Gaseous Diffusion Plant (DOE 1981). Hazardous materials (V_4) were based on the presence or absence of fuel, oil, and pesticide containers, equipment, or contaminated soil. Aquatic macroinvertebrates were sampled with a modified surber sampler, and dry weight biomass (V_5) for each sample was measured by the U.S. Forest Service, Intermountain Region, Aquatic Ecosystem Analysis Laboratory (U.S. Forest Service 1986). Habitat Access (V_9) was based on the presence or absence of impassable natural or man-made stream barriers. Fines in substrate (V_6), instream cover (V_7), percent pools (V_8), streambank vegetation (V_{10}), bank stability (V_{11}), and average wetted stream width were measured using the line-transect method (Hamilton and Bergersen 1984).

APPENDIX 2
Cumulative Impact Methodology

In 1988, streams, riparian vegetation, and disturbance within the two study areas were digitized for GIS entry from low-level color-infrared (1:12,000) photos taken in 1986, high-altitude color-infrared (1:63,360) photos taken in 1984, and from USGS 1:63,360 quadrangle maps. Stream reach lengths, area of disturbance adjacent to the stream reach (V_{12}), and area of disturbance upstream of the reach (V_{13}) were determined using the Yukon-Charley Rivers GIS database.

Arctic Grayling Habitat Suitability Index (HSI) Model

Figure 1 depicts the theoretical relationships among environmental variables, components, and HSI for the arctic grayling model.

The following model is applicable only to streams in the two study areas within Yukon-Charley Rivers National Preserve. Since grayling likely migrate from the study area streams to overwinter in the Yukon River, the model rates stream habitat from mid-spring to mid-fall only. Model verification consisted of checking the output of the model using habitat data collected in the study area streams and comparing this to fish population data collected at the same sites.

The HSI model consists of three components: (1) water quality, (2) stream morphometry, and (3) sediment loading.

Water Quality. This component includes five water quality variables that govern stream production capabilities and health of all grayling life stages. Land use activities have been shown to have an adverse effect on these five water quality variables. Turbidity (V_1), pH (V_2), and heavy metals (V_3) affect the growth and survival of all life stages. The presence and use of hazardous materials (V_4) in the stream corridor such as oil, fuel, pesticides, mercury, nitric acid, and other hazardous materials associated with placer mining increase the potential for increased mortality and decreased stream productivity. Macroinvertebrate biomass (V_5) was included as a water quality component because aquatic invertebrates are sensitive to short-term changes in water quality. Aquatic macroinvertebrates are an important food source for fry, juveniles, and adults.

Stream Morphometry. This component includes five habitat variables that influence the quality of habitat for all grayling life stages. Land use activities have been shown to adversely change these stream morphometry variables. Percent fines in channel substrate (V_6) is included because the presence of excessive fines in stream substrate reduces the production of aquatic insects and reduces survival of grayling eggs and fry developing in the substrate. Percent instream cover (V_7) is included because standing crops of adult salmonids is related to the amount of cover available. Percent pools (V_8) is included because pools provide cover and resting areas for grayling. Habitat access (V_9) is included because stream obstructions can reduce habitat access between wintering areas and spawning and feeding areas, thus limiting fish production. Streambank vegetation (V_{10}) is included because allochthonous materials are an important source of nutrients to cold, unproductive salmonid streams.

Sediment Loading. This component includes three habitat variables that influence the amount of sediment which is input into a stream. Stream sediment transport influences the production capabilities of a stream ecosystem. Land use activities can accelerate watershed erosion and increase stream sediment levels. Bank stability (V_{11}), area of adjacent disturbance (V_{12}), and area of upstream disturbance (V_{13}) were included because riparian land uses and nonpoint pollution from disturbed areas have been shown to reduce stream production potential and adversely effect all grayling life stages.

Suitability Index (SI) Graphs for Model Variables

This section contains suitability index graphs for 13 model variables (table 1). The equation for combining variable SI's and component scores into an arctic grayling HSI is included. In some cases, the habitat measurements and SI graphs construction are based on the premise that extreme, not average, variable values limit the productive capabilities of a habitat. Data sources and the assumptions used to construct the suitability index graphs for the arctic grayling HSI model are presented in table 2.

APPENDIX 2
Cumulative Impact Methodology

The graphs were produced by quantifying information in the literature on the effect of each habitat variable on survival and abundance of arctic grayling. Additional information from selected references on other salmonid species was used to supplement data gaps on the habitat requirements of arctic grayling. The curves were generated on the assumption that increments of survival, abundance, and biomass on the y-axis of the graph could be directly converted into an index of suitability from 0.0 to 1.0 for the species. Habitat variables were divided into categories corresponding to five levels of suitability. Each SI graph scores habitat variables on a discrete scale of 0.0 (zero suitability), 0.25 (low suitability), 0.5 (moderate suitability), 0.75 (high suitability), or 1.0 (optimum suitability). Using discrete SI graphs reduces variability of model outputs caused by variations in data sets with small sample sizes. This effectively increases the repeatability of results for grayling habitat analyses using this model. Also, discrete HSI model curves simplifies the sampling needed in a habitat evaluation effort (COE 1988).

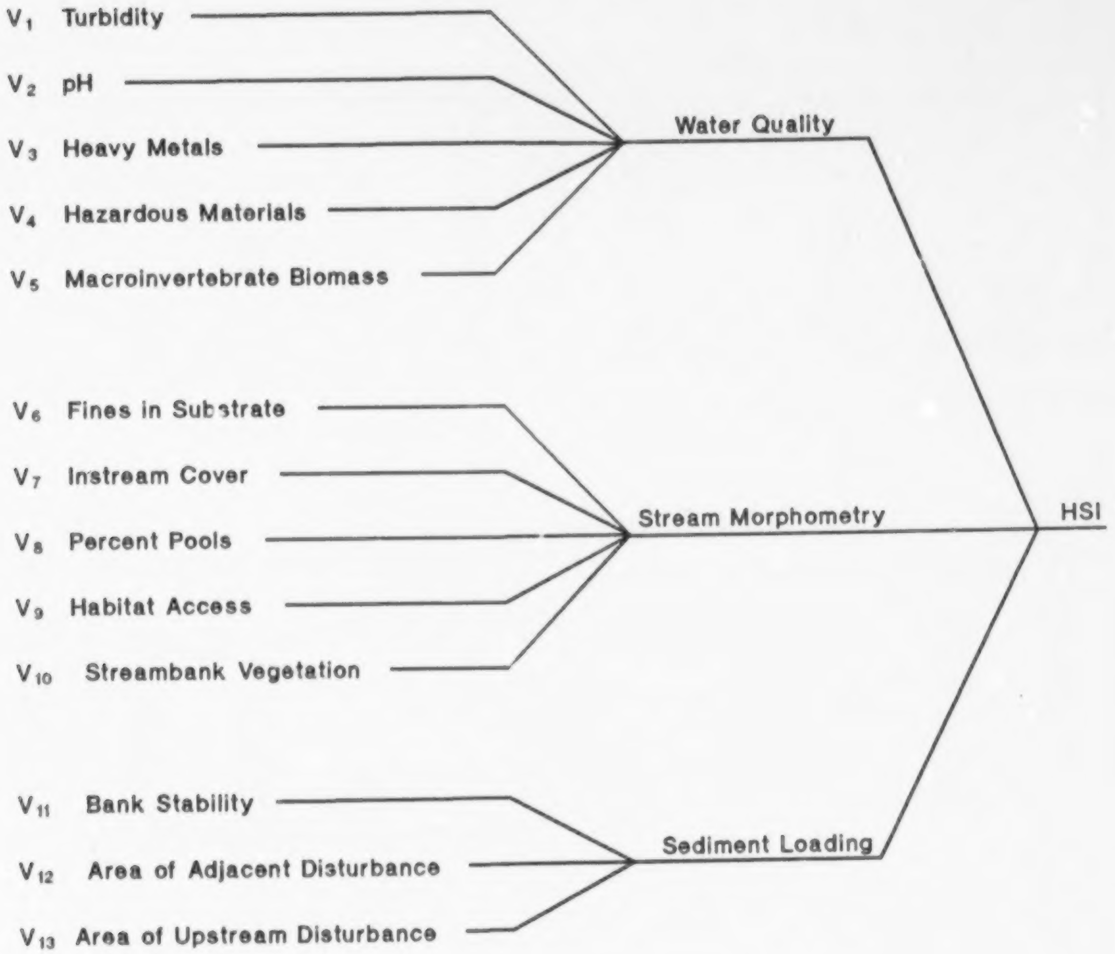

V_1 Turbidity
V_2 pH
V_3 Heavy Metals
V_4 Hazardous Materials
V_5 Macroinvertebrate Biomass
Water Quality
V_6 Fines in Substrate
V_7 Instream Cover
V_8 Percent Pools
V_9 Habitat Access
V_{10} Streambank Vegetation
Stream Morphometry
HSI
V_{11} Bank Stability
V_{12} Area of Adjacent Disturbance
V_{13} Area of Upstream Disturbance
Sediment Loading

Figure 1. Diagram illustrating the relationship among model variables, components, and HSI.

Table 1. Definitions and Suitability Index Graphs for the 13 Variables Included in the Arctic Grayling HSI Model.

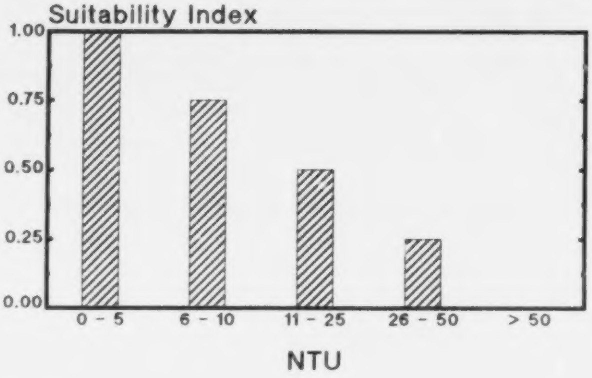
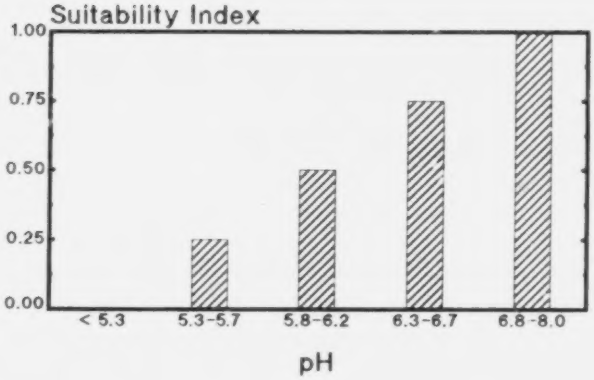
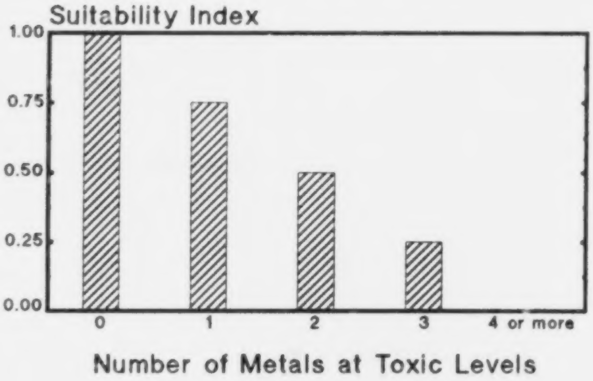
Variable and Definition	Suitability Index Graph
V_1 Average turbidity (NTU) during low summer flows.	
V_2 Minimum pH during the summer.	
V_3 The number of heavy metals which exceed the 1986 EPA recommended water quality criteria for the protection of aquatic life.	

Table 1. Continued.

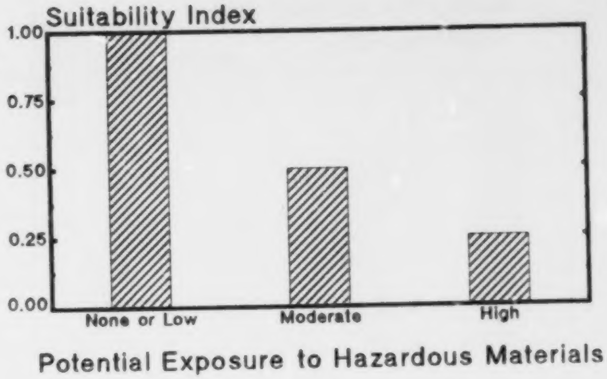
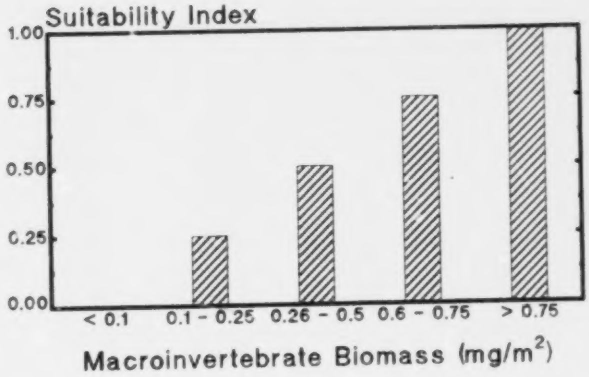
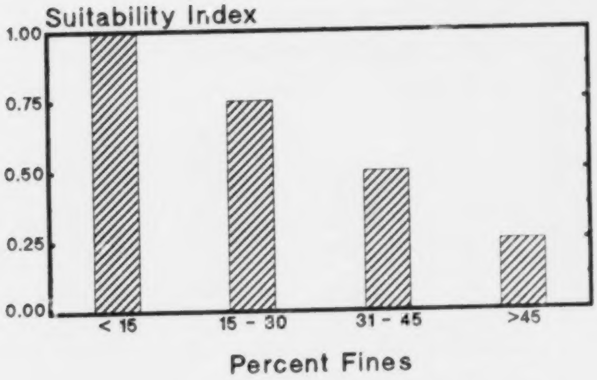
Variable and Definition	Suitability Index Graph
V_4 Potential exposure to hazardous material stored or used within the stream corridor.	
V_5 Average dry weight standing crop (mg/m^2) of aquatic macroinvertebrates in riffle areas.	
V_6 Percent fines in stream channel substrate.	

Table 1. Continued.

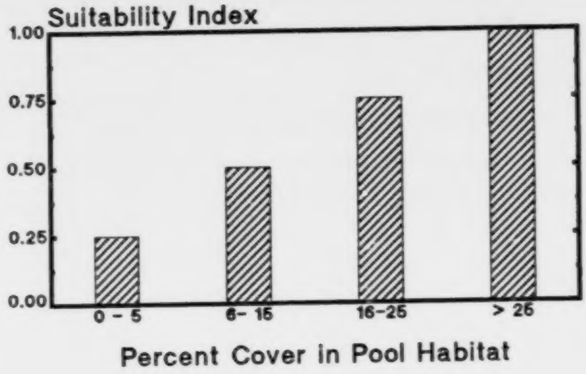
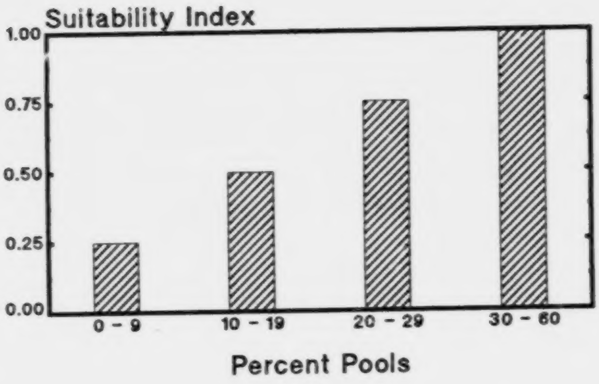
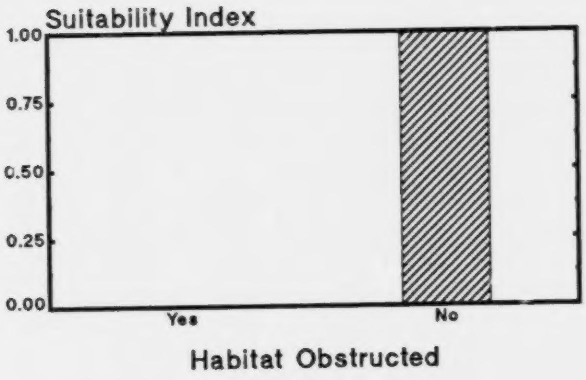
Variable and Definition	Suitability Index Graph
V_7 Percent cover in pool habitat during the summer low water periods.	
V_8 Percent pools during the summer low water periods.	
V_9 Occurrence of stream obstructions which block fish access to spawning and feeding areas.	

Table 1. Continued.

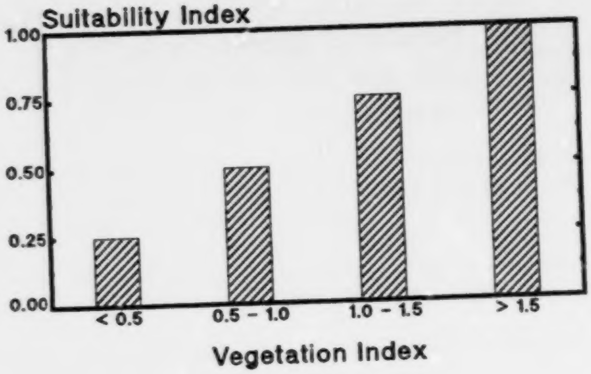
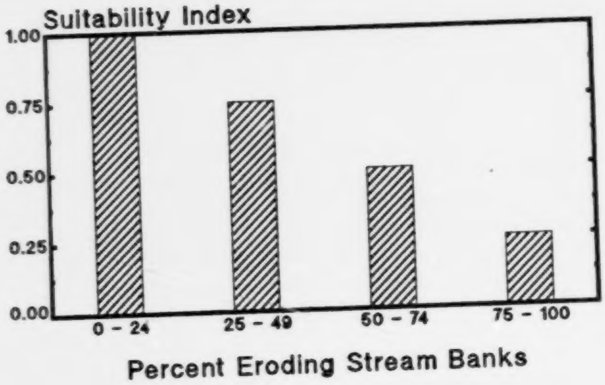
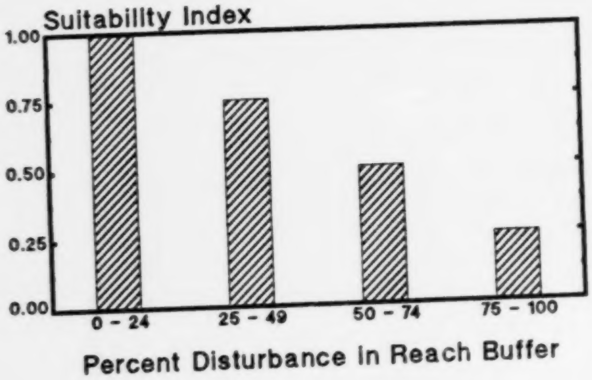
Variable and Definition	Suitability Index Graph
V_{10} Average percent vegetation (trees, shrubs, and grasses-forbs) along the streambank during the summer for allochtonous input. Vegetation Index = 2 (% shrubs) + 1.5 (% grasses) + (% trees)	
V_{11} Average percent of the stream banks actively eroding.	
V_{12} Percent of adjacent area in a 400 feet wide stream buffer disturbed.	

Table 1. Continued.

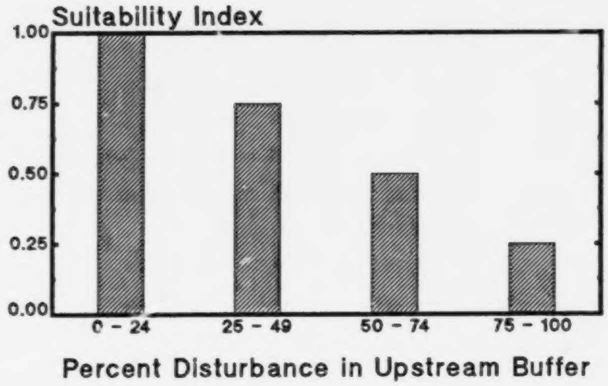
Variable and Definition	Suitability Index Graph
V_{13} Percent of upstream area in a 400 feet wide stream buffer disturbed.	

Table 2. Data Sources and Assumptions for Arctic Grayling Indexes

Variable	Source	Assumption
V_1	Sumner and Smith 1940 COE 1986 ADF&G 1985 Lloyd 1987 Lloyd et al. 1987	Increased turbidity during summer low water periods reduces productivity and diversity of stream insects. Growth of grayling is related to aquatic invertebrate production. Turbidity reduces the feeding efficiency of sight-feeding fish and causes physiological stress.
V_2	USFWS 1984 EPA 1986	Optimal pH levels for aquatic organisms range between 6.5 - 8.0. Survival and growth of salmonids is related to pH levels.
V_3	COE 1986 EPA 1985, 1986	Elevated metals concentrations in water decreases productivity and diversity of stream organisms.
V_4	Whyte and Burton 1980	The probability of stream habitat damage is correlated to presence and use of hazardous materials in the stream corridor.
V_5	Vascotto 1970 Cuccarese et al. 1980 ADF&G 1980, 1982	Abundance and growth of grayling is correlated to aquatic macroinvertebrate biomass
V_6	Brown 1938 Nelson 1954 Cordone and Kelley 1961 Bishop 1971 Kratt and Smith 1977 Reiser and Bjornn 1979 Alexander and Hansen 1986 COE 1986	High amounts of fine material prevent embryos from entering interstitial spaces, prevent water flow to the embryos, and hinder emergence. High amounts of fines limit aquatic insect production. Less than 15 percent fines in stream channel substrate is needed for optimum embryo survival and aquatic insect production.
V_7	Vascotto 1970 ADF&G 1985	Grayling abundance is correlated with the amount of usable cover. Usable cover is associated with pool habitat.
V_8	Nelson 1954 Vascotto 1970 ADF&G 1980, 1985	The percent of the pools during summer low water periods is associated with the greatest grayling abundance.
V_9	Brown 1938 Vascotto 1970 Bishop 1971 Kratt and Smith 1977 ADF&G 1964, 1980, 1982	Arctic grayling are annual spawners with relatively short life span on reaching sexual maturity. They are believed to home to spawning streams. Barriers that inhibit migration to spawning and feeding areas prevent successful spawning, reduces fish production, and impact particular spawning populations. Optimal access to spawning and feeding tributaries is annual.

Table 2. Continued

Variable	Source	Assumption
V_{10}	Idyll 1942 Chapman 1966 Hunt 1971 Meehan et al. 1977	The average percent of vegetation along the streambank is related to the amount of allochthonous materials deposited annually in the stream. Shrubs are the best source of allochthonous materials followed by grasses and forbs, and then trees. The vegetational index is a reasonable approximation of optimal conditions for most salmonid stream habitats.
V_{11}	Raleigh and Duff 1981	The lowest average percent of unstable banks is optimum.
V_{12}	Leopold et al. 1964 Dunne and Leopold 1978 Platts et al. 1985 Emmett 1988	The area of disturbance adjacent to the stream is correlated to the amount of sediment transported to the stream. Increased sediment input reduces stream productivity and grayling growth and survival.
V_{13}	Leopold et al. 1964 Dunne and Leopold 1978 Platts et al. 1985 Emmett 1988	The area of disturbance upstream of a stream reach is correlated to the amount of sediment transported to the stream. Sediment loaded into a stream will have an effect far downstream from its source.

HSI Determination

The model is composed of three components: (1) water quality (C_1), (2) stream morphometry (C_2), and (3) sediment loading (C_3). Water quality variables include V_1, V_2, V_3, V_4, and V_5. Stream morphometry variables include V_6, V_7, V_8, V_9, and V_{10}. Sediment loading variables include V_{11}, V_{12}, and V_{13}. The equation for the HSI model is:

$$\text{HSI} = [\text{minimum}(V_1,V_2,V_3,V_4,V_5) \text{ X } \text{minimum}(V_6,V_7,V_8,V_9,V_{10}) \text{ X } \text{minimum}(V_{11},V_{12},V_{13})]^{1/3}$$

The first step in calculating the HSI is to derive three component scores for water quality (C_1) stream morphometry (C_2), and sediment loading (C_3) using a limiting factor procedure. The assumption for using the limiting factor is that the lowest SI is limiting and overrides the other variables. Component scores are determined as follows:

C_1 = lowest value of V_1, V_2, V_3, V_4, or V_5
C_2 = lowest value of V_6, V_7, V_8, V_9, or V_{10}
C_3 = lowest value of V_{11}, V_{12}, or V_{13}

The second step in calculating the HSI is to combine the three component scores by computing their geometric mean. This formula was used because the assumed relationship between components is such that some compensations exist. Optimum conditions can exist only if all three component scores are equal to 1.0, where as if any one component score equals 0.0, the HSI value will also equal 0.0. The assumption for using the geometric mean is that marginal or low suitability of one component is compensated by the high suitability of the other components. The geometric mean produces a smaller HSI than the arithmetic mean when the score for one or two components is lower than the other components. The geometric mean was computed because the compensatory relationship between the three components is considered weak. HSI is determined as follows

$$HSI = (C_1 \text{ X } C_2 \text{ X } C_3)^{1/3}$$

HU Determination

Arctic grayling habitat units in the two study areas were estimated for four points in time: (1) before mining began (premining conditions), (2) at the end of the past mining period (existing conditions), (3) during the future active-mining period, and (4) the first year after all future mining ends. Study area habitat units were determined on a stream reach basis. Stream reaches were delimited based on the relation to claim location, existing disturbance, and habitat homogeneity. Existing condition HUs were computed for each reach using current reach habitat data. Premining and existing condition HUs were assumed to be the same for reaches which were not affected by past mining. Premining habitat conditions for reaches with existing impacts were estimated using pristine stream reach data assumed to represent premining conditions for the affected reaches. Future habitat conditions were estimated for both an active-mining period (short-term) and a period after future mining ceases (long-term) using adjusted stream habitat data for reaches affected by the mineral development scenario. Future habitat conditions were estimated using habitat information from study area reaches with existing impacts and current literature on placer mining impacts on stream ecosystems. The following steps were used for calculating HUs for each study area.

1. Stream reach area = reach length X average wetted width
2. Compute arctic grayling HSI for each reach
3. Stream reach HU = HSI X reach area
4. Study area HU = sum of all reach HUs in the study area

The duration of long-term habitat loss cannot be accurately predicted because of the number of variables inherent with placer mining. The duration of impacts would depend on mitigation and reclamation measures implemented. The number of HUs would gradually increase each year during the post-mining period as habitat conditions recover.

At the current verification level the numbers generated by the arctic grayling model provides an index for comparison of alternatives only. Readers should note that any attempts to determine numbers or standing crop of fish that would result from losses of habitat caused by implementing any of the alternatives should be avoided.

ASSUMPTIONS FOR QUALITATIVE TARGET RESOURCES

Assumptions for the Recreation and Visitor Use Target Resource

1. One of the main purposes of any park unit is to provide for recreational opportunities.

2. Without any change from existing conditions, the number of recreational participants will follow historical trends and the types of recreation found in each study area will not change (e.g., there will be no new form of recreation increasing visitor use in the study area).

3. "Visitor use" for this analysis constitutes the number of recreational participants.

4. Impacts to recreational quality vary greatly with each type of recreational use. Therefore, the recreational quality of the study area is determined by examining the impacts to the most popular forms of recreation found in the particular study area.

5. The degree of impact to recreational use and quality resulting from mining-related activities depends on the location, duration, timing, and frequency or extent of activity (peak recreational use coincides with peak mining use).

Assumptions for Wilderness Values Target Resource

1. Lands recommended for wilderness designation in the Final Wilderness Recommendation EIS will be designated as such.

2. Guidelines for which wilderness is currently designated will not change over time.

3. In the short-term, lands unsuitable for wilderness designation (mining claims, mining disturbance, etc.) will remain unsuitable.

4. In the long-term, areas disturbed by mining could return to "natural" conditions, normally through reclamation, and wilderness values could be regained.

Assumptions for Local Economy Target Resources

1. Mining activities played an economic role in the vicinity.

2. Under normal conditions, the economic makeup of local communities will remain approximately the same over time except for normal change and growth.

3. Impacts from mining operations are seasonal and annual, and they vary greatly from year to year.

4. Employment and expenditures from mining operations discussed in this analysis are "average" according to the ADCED (1986) study.

5. The local economy share of total mining expenditures is equal to the percentage of expenditures expected in the local communities.

6. The local economy share of total mining expenditures for lode mining operations is similar to that of placer operations.

APPENDIX 3. LAND COVER TYPES

FOREST

The forest communities are defined as having 25 percent or more spruce and/or broadleaf deciduous tree canopy cover.

Coniferous Forest

White spruce is the dominant tree species in Yukon-Charley Rivers National Preserve evergreen forests. Nearly pure stands of white spruce are located in areas of moderate drainage from the lowlands bordering the Yukon River up to an elevation of 3,000 feet. Throughout most of the preserve, the white spruce forests generally form a comparatively narrow strip along the banks of rivers and streams; are then replaced by coniferous woodland, low shrub, bog, or marsh inland from the stream bank; and may then reappear as an extensive type on bluffs and slopes at some distance from the water course.

Small isolated stands of typical white spruce forest are often found on the slopes of broad valleys in the headwaters of the various tributaries of the Charley River.

In a typical white spruce forest, other tree species are sparse, understory shrubs are rare, and the forest floor is dominated by shade-tolerant mosses and herbs.

White spruce forests predominate on lowlands along the Yukon River and near the mouth of major tributaries where periodic flooding occurs. Here the forests tend to be more open, and a well developed understory is present. Typical understory species include: alder, high bush cranberry, prickly rose, and currants.

Dense stands of black spruce occur in a few areas, particularly along the north shore of the Yukon River in the western portion of the preserve.

Mixed Coniferous-Broadleaf Deciduous Forest

This type of forest is rather variable in composition, but the main species found are white spruce and white birch. These forests are often mixed with small pockets of black spruce woodland.

Mixed forests are successional in nature and are usually correlated with recent fires.

Mixed forests are most developed on the somewhat broken terrain at the foot of the mountains near the Yukon River. The understory is similar to that of pure white birch forests, but the forest floor is generally moister and more deeply covered with species of Sphagnum and other mosses.

Broadleaf Deciduous Forest

This category can be further subdivided based on species composition. One deciduous forest type occurs at low elevations, particularly along river flats and on bars and islands; the dominant tree species is balsam poplar, which normally exists in pure stands. A second deciduous forest type occurs in higher, better drained areas; paper birch is usually the dominant species, although balsam poplar and occasionally quaking aspen are also found.

The balsam poplar forests reach their best development on islands in the Yukon River. A closed canopy forest consisting of poplar may reach a height of 100 feet , with individual specimens approaching 3 feet in diameter.

The understory of balsam poplar stands is similar to shoreline white spruce forest understory, with dense growth of prickly rose, high bush cranberry, and currant species predominating. The vegetation of the forest floor consists largely of horsetails, various sedges and grasses, and some species typical of shady forest situations.

Birch forests are characteristic of moist, gently rolling or sloping situations, mainly on the hills and bluffs near the Yukon River and the lower reaches of its major tributaries. Dense, pure stands of white birch are typical of successional vegetation communities which develop following a fire.

Mature birch forests commonly have an understory consisting largely of lingonberry, bluebell, bearberry, wintergreen species, and other shade-tolerant herbs and dwarf shrubs. Labrador tea and alpine blueberry are mainly confined to openings in the forest.

In a few areas, such as the tops of some of the lower bluffs along the Yukon River, white birch is replaced by quaking aspen. The understory species are similar to those found in birch forests.

WOODLAND

Woodland communities are defined as having 10 to 24 percent spruce and/or broadleaf deciduous tree canopy cover.

Broadleaf Deciduous Woodland

The broadleaf deciduous woodland is rather uncommon and could be further broken down into two subtypes based on dominant species. A characteristic broadleaf deciduous woodland is developed on the upper slopes of some of the dry bluffs along the Yukon River, where it commonly replaces arid scrub at high elevations. The dominant species are mountain alder and shrubby birches up to 30 feet tall. The understory is variable, but it often consists of a mixture of grasses and shrubs such as high bush cranberry and currants.

The second type of broadleaf woodland consists predominately of white birch and/or quaking aspen. This is essentially an open form of the broadleaf forest described above.

Coniferous Woodland

Black spruce is the dominant tree species in the coniferous woodland plant community. This community is found throughout the study area from the level areas along the Yukon River to elevations of over 1,500 feet, and it can occur and on slopes of up to 30 percent grade. This type of vegetation is commonly called muskeg. Muskeg is generally found on deep deposits of peat and muck on flat or gently rolling terrain at low elevations where the the permafrost table is shallow and drainage is poor. The most extensive areas are immediately adjacent to the Yukon River and its tributaries, normally separated from the river banks by a narrow band of white spruce forest. Presence of muskeg usually indicates permafrost at shallow depths.

Typical understory shrub species in black spruce woodland include blueberry, lingonberry, labrador tea, and diamond-leaf willow. Important herbaceous and semi-herbaceous species include tussock cotton grass and aquatic sedge, tussock formers, and cloudberry, Arctic lupine (*Lupinus arcticus*), *Sphagnum*, and a variety of other species characteristic of the boreal forest and low arctic regions.

In some shaded, steep slopes, black spruce woodland is developed on dry, stony substrates. In these cases, the forest floor is normally dominated by a deep, thick bed of mosses, and there is often little underbrush.

At elevations of from 2,000 to 3,000 feet in the vicinity of the headwaters of the Charley River, open black spruce woodland is developed on dry substrates. Here the undergrowth consists mainly of lichens (*Cladonia spp.*), and scatterd clumps of shrubs such as Labrador tea.

Moderate-sized black spruce trees in coniferous woodland areas have been aged at 300 or more years old, indicating that forest fires are uncommon.

Mixed Woodland

Mixed woodland forests are mainly confined to flat areas of low elevation near the Yukon River and the lower reaches of the major tributaries. The major tree species present are black spruce, white birch, alder, and several tall willow species including particularly long-beaked and grayleaf willow. In general, the understory of this type of woodland is also a mixture of the species chracteristic of black spruce muskeg and deciduous woodland.

Broadleaf Deciduous Woodland

The broadleaf deciduous woodland is rather uncommon and could be further broken down into two subtypes based on dominant species. A characteristic broadleaf deciduous woodland is developed on the upper slopes of some of the dry bluffs along the Yukon River, where it commonly replaces arid scrub at high elevations. The dominant species are mountain alder and shrubby birches up to 30 feet tall. The understory is variable, but often consists of a mixture of grasses and shrubs such as high bush cranberry and currants.

The second type of broadleaf woodland consists predominately of white birch and/or quaking aspen. This is essentially an open form of the broadleaf forest described above.

SCRUB

The scrub communities have at least 25 percent shrub cover or at least 10 percent dwarf tree (trees less than 1 m high) cover.

Tall Scrub

Scrub, as defined herein, also consists of two rather distinct types of vegetation on the basis of species represented. In riparian zones, on islands and bars, and on shorelines in and near the Yukon River, scrub is mainly a dense growth of willows (littletree willow, Alaska willow, and others) sometimes with a greater or lesser admixture of alder. This type is often referred to as riparian willow thicket.

Another type of scrub occurs at moderate elevation near the headwaters of some of the tributaries of the Charley River. In these broad, open, largely unforested valleys, there are commonly extensive patches of dense brush. In these situations, the dominant species is normally diamond-leaf willow, although grayleaf willow may be locally dominant.

Undergrowth is variable in willow thickets; its composition seems to depend on the density of the willows and on the prevalence of inundation and scouring of the soil surface by flowing water. In the most heavily disturbed situations, common horsetail may totally dominate the understory, while the more sheltered areas may develop a varied and complex vegetation on the forest floor.

APPENDIX 3
Land Cover Types

Low Scrub

This vegetation class is a close counterpart of the black spruce muskeg. It resembles the latter type in essentially all aspects, except that it is nearly devoid of tree growth. Typically, low scrub is found below timberline, but it may occur at higher elevations in the preserve in northern area of the preserve. Low scrub is commonly found as irregular patches on gently sloping or level areas, often with well-defined boundaries. This is particularly true near rivers, where the white spruce forest may give way to open scrub within a distance of only a few feet.

The major species found in low scrub are essentially those listed in the understory under coniferous woodland. At higher elevations, shrub birch or dwarf birch, and diamond-leaf willow tend to be more important.

Arid Scrub

The arid scrub community is typical of steep bluffs and hot, dry, southfacing slopes within the preserve. In general, it is developed on rock cliffs and stony slopes at elevations between river level and about 2,500 feet. The dominant species in most situations are wormwoods, especially prairie wormwood. Other important species are common mountain juniper, purple reedgrass, and quaking aspen. This vegetation type may represent a relict community of the arctic-steppe biome of the quaternary period.

HERBACEOUS

The herbaceous communities are in areas where less than 25 percent shrub cover or less than 10 percent dwarf tree cover exists.

Bogs

Bog is a special type of vegetation occurring in the preserve on flats along the Yukon River and the lower portion of the Charley River. It is usually found interspersed with white spruce forest and black spruce woodland. Bog vegetation is highly variable; thus, it is difficult to characterize with respect to typical species. Dominant bog species include *Sphagnum*, dwarf ericaceous shrubs, and other species characteristic of acidic, peaty situations.

Typical species of bog vegetation include the species already mentioned in Dwarf Scrub and as understory in black spruce woodland. In general, Sphagnum *spp* are more dominant in bogs than in the preceeding types, and species such as *Andromeda polifolia* and *Oxycoccus microcarpus* are commonly important. In some cases, nearly pure stands of buckbean dominate the bog vegetation.

Marsh

Marshes normally are developed on relatively small areas near the shores of the Yukon River and along the lower reaches of the larger tributaries. They often form on the shores of shallow sloughs, in the remnants of cutoff lakes, and in similar situations.

It is not possible to characterize the vegetation of a typical marsh, since there is a great diversity in regard to the floristics of different examples of this type. Common aquatic vascular plants found in the preserve include horsetail species, water smartweed, and pondweed species.

APPENDIX 3
Land Cover Types

Marshes are found in areas on which herbaceous vegetation has developed on permanently or periodically flooded situations, and where Sphagnum, Ericaceae, and other groups typical of bog vegetation do not form a significant portion of the flora.

Alpine Tundra

Alpine tundra covers broad areas at mid elevations on the more moderate slopes of the mountains and in the broad upland valleys associated with the headwaters of the various tributaries of the Charley River. This vegetation class is similar to low scrub, but it is generally developed in more mesic situations than the peat and muck on which the latter type is normally found. A variety of upland scrubby vegetation including a number of the lower-growing *Salix* species and dwarf shrub are included in the alpine tundra. Alpine tundra is variable with regard to the dominant species, depending on elevation, exposure, slope, and the moisture regime of the soil. Thus, it is difficult to distinguish a typical array of species.

ROCKLAND

This vegetation type is normally confined to steep slopes and windswept ridges at high elevations. At a distance, it appears to be essentially devoid of vegetation. However, a wide variety of lichens are found on the surfaces of exposed rock, and there are at least 250 species of vascular plants found in this type. Some species with high arctic affinities are confined to this type in the Yukon-Charley Rivers National Preserve. Taxon confined to these rockland areas include various Saxifraga species, *Primula tschuktschorum*, and *Arnica Lessingii*. Except in the highest and most exposed situations, rockland is normally interspersed with patches of alpine tundra.

APPENDIX 4. THREATENED AND ENDANGERED SPECIES CONSULTATION

United States Department of the Interior
NATIONAL PARK SERVICE

ALASKA REGIONAL OFFICE
2525 Gambell Street, Room 107
Anchorage, Alaska 99503 - 2892

IN REPLY REFER TO:
L3023(ARO-RMM)

[illegible] 1989

Memorandum

To: Regional Director, Region 7, U.S. Fish and Wildlife Service

From: Acting Regional Director, Alaska Region, National Park Service

Subject: Consultation on Section 7 of the Endangered Species Act

The National Park Service is preparing an environmental impact statement (EIS) on the cumulative effects of mining within the Yukon-Charley Rivers National Preserve. The EIS alternatives are programmatic and range from allowing mining activity subject to existing NPS authorities and regulations to acquiring all mining claims in the preserve. Attachment 1 provides more detailed information on the EIS alternatives. A location map showing the areas of mineral activity being analyzed in the EIS is also attached (attachment 2). In general, mining operations occur on Woodchopper Creek, Boulder Creek, Ben and Sam creeks, and Fourth of July Creek.

This is to formally request consultation for threatened and endangered species for compliance with Section 7 of the Endangered Species Act relative to implementing the alternatives contained in this EIS within the Yukon-Charley Rivers National Preserve. Please provide us with any updated information regarding endangered and threatened species that may occur in the areas covered by this EIS, or may be affected by the actions analyzed under the various alternatives.

Thank you for your assistance. Please direct any comments or requests for additional information to Floyd Sharrock, Chief, Minerals Management Division (907-257-2626) or Dan Hamson, EIS Project Coordinator (907-257-2623).

Richard J. Stenmark

Enclosures

bcc:
USFWS: Bowker
YUCH: Superintendent
DSC-TWE: Hawkes
ARO-RNR: Cella
ARO-RMM: Sharrock
ARO-MMB: Griffiths
ARO-RAB: [redacted]/Hamson/Hunt

SMHunt:lg:4/14/88:stieg.let

United States Department of the Interior

FISH AND WILDLIFE SERVICE

IN REPLY REFER TO:

Endangered Species, Fairbanks
1412 Airport Way
Fairbanks, AK 99701

December 14, 1988

Steve Hunt
Project Coordinator
National Park Service
2525 Gambell Street
Anchorage, AK 99503-2892

Dear Mr. Hunt:

I reviewed the Preliminary Draft Environmental Impact Statement for mining in the Yukon-Charley Rivers National Preserve and concur with the findings in that document relative to the potential impacts on peregrine falcons. Although none of the alternatives would result in a significant lose of peregrine falcon prey habitat, Alternative D would have the least impact.

Thank you for you concern for endangered species and the attention given peregrine falcons in the Preliminary Draft Environmental Impact Statement.

Sincerely,

Skip Ambrose

Skip Ambrose
Project Leader

cc: Steve Cain, Denver Service Center

APPENDIX 5 APPLICABLE MANDATES, REGULATIONS, AND CONGRESSIONAL RECORDS

AUTHORITY	NOTES
National Park System Organic Act (16 USC 1 et seq.)	Established the National Park Service on August 16, 1916. Defined statement of purpose for individual units administered by the National Park Service. Directed that conservation and preservation of the natural and historic resources are fundamental to the existence of NPS units and enjoyment by future generations.
Act for Administration of the National Park System of 1970 (16 USC 1a)	Directed that all units under administration by the National park Service are part of the National Park System. Requires management of each unit according to its specific enabling law. Also, National Park System Organic Act (PL 64-235) applies equally to all National Park System units.
1978 Amendment of Act for Administration of the National Park System (16 USC 1a-1)	Reaffirmed that activities not specifically authorized by Congress are not permitted in NPS units if the activity is in derogation of the values and purposes for which the unit was established.
Specific enabling laws	Establish new units of the National Park System. May contain explicit language allowing activities not normally permitted in NPS units.
Alaska National Interest Lands Conservation Act of 1980 (ANILCA)	ANILCA section 201 established 10 new Alaska NPS units. ANILCA section 202 expanded 3 existing NPS units. ANILCA section 206 withdrew the federal lands within the new and enlarged NPS units from mineral entry, location, and patent, subject to valid existing rights. ANILCA section 815(1) directed the conservation of natural and healthy populations of fish and wildlife for subsistence uses.
Antiquities Act of 1906 (16 USC 431)	Section 2 authorized the President to declare by public proclamation historic landmarks, historic and prehistoric structures, and other objects historic or scientific interest on lands owned by the United States Government as national monuments. Proclamation 4616 established Denali National Monument. Proclamation 4625 established Wrangell-St. Elias National Monument. Proclamation 4626 established Yukon-Charley Rivers National Preserve.

NATIONAL PARK SYSTEM ORGANIC ACT

VARIOUS ACTS RELATING TO ADMINISTRATION OF NATIONAL PARK SYSTEM

THE NATIONAL PARK SYSTEM ORGANIC ACT (AUGUST 25, 1916)[1]

P.L. 64-235

CHAP. 408.—AN ACT To establish a National Park Service, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That there is hereby created in the Department of the Interior a service to be called the National Park Service, which shall be under the charge of a director, who shall be appointed by the Secretary and who shall receive a salary of $4,500 per annum. There shall also be appointed by the Secretary the following assistants and other employees at the salaries designated: One assistant director, at $2,500 per annum; one chief clerk, at $2,000 per annum; one draftsman, at $1,800 per annum; one messenger, at $600 per annum; and, in addition thereto, such other employees as the Secretary of the Interior shall deem necessary: *Provided,* That not more than $8,100 annually shall be expended for salaries of experts, assistants, and employees within the District of Columbia not herein specifically enumerated unless previously authorized by law. The service thus established shall promote and regulate the use of the Federal areas known as national parks, monuments, and reservations hereinafter specified by such means and measures as conform to the fundamental purpose of the said parks, monuments, and reservations, which purpose is to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations.

SEC. 2. That the director shall, under the direction of the Secretary of the Interior, have the supervision, management, and control of the several national parks and national monuments which are now under the jurisdiction of the Department of the Interior, and of the Hot Springs Reservation in the State of Arkansas, and of such other national parks and reservations of like character as may be hereafter created by Congress: *Provided,* That in the supervision, management, and control of national monuments contiguous to national forests the Secretary of Agriculture may cooperate with said National Park Service to such extent as may be requested by the Secretary of the Interior.

SEC. 3. That the Secretary of the Interior shall make and publish such rules and regulations as he may deem necessary or proper for the use and management of the parks, monuments, and reservations under the jurisdiction of the National Park Service, and any violations of any of the rules and regulations authorized by this Act shall be punished as provided for in section fifty of the Act entitled "An Act to codify and amend the penal laws of the United States," approved March fourth, nineteen hundred and nine, as amended by section six of the Act of June twenty-fifth, nineteen hundred and ten (Thirty-sixth United States Statutes at Large, page eight hundred and fifty-seven). He may also, upon terms and conditions to be fixed by him, sell or dispose of timber in those cases where in his judgment the cutting of such timber is required in order to control the attacks of insects or diseases or otherwise conserve the scenery or the natural or historic objects in any such park, monument, or reservation. He may also provide in his discretion for the destruction of such animals and of such plant life as may be detrimental to the use of any of said parks, monuments, or reservations. He may also grant privileges, leases, and permits for the use of land for the accommodation of visitors in the various parks, monuments, or other reservations herein provided for, but for periods not exceeding thirty years; and no natural curiosities, wonders, or objects of interest shall be leased, rented, or granted to anyone on such terms as to interfere with free access to them by the public: *Provided, however,* That the Secretary of the Interior may, under such rules and regulations and on such terms as he may prescribe, grant the privilege to graze live stock within any national park, monument, or reservation herein referred to when in his judgment such use is not detrimental to the primary purpose for which such park, monument, or reservation was created, except that this provision shall not apply to the Yellowstone National Park: *And provided further,* That the Secretary of the Interior may grant said privileges, leases, and permits and enter into contracts relating to the same with responsible persons, firms, or corporations without advertising and without securing competitive bids: *And provided further,* That no contract, lease, permit, or privilege granted shall be assigned or transferred by such grantees, permittees, or licensees, without the approval of the Secretary of the Interior first obtained in writing: *And provided further,* That the Secretary may, in his discretion, authorize such grantees, permittees, or licensees to execute mortgages and issue bonds, shares of stock, and other evidences of interest in or indebtedness upon their rights, properties, and franchises, for the purposes of installing, enlarging, or improving plant and equipment and extending facilities for the accommodation of the public within such national parks and monuments.

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[1] This short title is not an official short title but merely a descriptive name used for the convenience of the reader. The Act has no official short title. The Act of Aug. 25, 1916 (16 U.S.C. 1, 2, 3, and 4), set forth herein, contains 39 Stat. 535 and the amendments made by the Act of June 2, 1920, ch. 218, sec. 5 (41 Stat. 732); the Act of Mar. 4, 1921, ch. 161, sec. 1 (41 Stat. 1407); the Act of Mar. 4, 1923, ch. 265 (42 Stat. 1488); the Act of Mar. 3, 1925, ch. 462 (43 Stat. 1176); the Act of Mar. 7, 1928, ch. 137, sec. 1 (45 Stat. 235); the Act of Mar. 2, 1934, ch. 38, sec. 1 (48 Stat. 389); and Public Law 85-434 (May 29, 1958).

SEC. 4. That nothing in this Act contained shall affect or modify the provisions of the Act approved February fifteenth, nineteen hundred and one, entitled "An Act relating to rights of way through certain parks, reservations, and other public lands."

ANILCA SECTION 201(10) - ESTABLISHMENT OF YUKON-CHARLEY RIVERS NATIONAL PRESERVE

Post, p. 2422.

Yukon-Charley Rivers National Preserve.

(10) Yukon-Charley Rivers National Preserve, containing approximately one million seven hundred and thirteen thousand acres of public lands, as generally depicted on map numbered YUCH-90,008, and dated October 1978. The preserve shall be managed for the following purposes, among others: To maintain the environmental integrity of the entire Charley River basin, including streams, lakes and other natural features, in its undeveloped natural condition for public benefit and scientific study; to protect habitat for, and populations of, fish and wildlife, including but not limited to the peregrine falcons and other raptorial birds, caribou, moose, Dall sheep, grizzly bears, and wolves; and in a manner consistent with the foregoing, to protect and interpret historical sites and events associated with the gold rush on the Yukon River and the geological and paleontological history and cultural prehistory of the area. Except at such times when and locations where to do so would be inconsistent with the purposes of the preserve, the Secretary shall permit aircraft to continue to land at sites in the Upper Charley River watershed.

ANILCA SECTION 206 - WITHDRAWAL FROM MINING

WITHDRAWAL FROM MINING

16 USC 410hh-5. SEC. 206. Subject to valid existing rights, and except as explicitly provided otherwise in this Act, the Federal lands within units of the National Park System established or expanded by or pursuant to this Act are hereby withdrawn from all forms of appropriation or disposal under the public land laws, including location, entry, and patent under the United States mining laws, disposition under the mineral leasing laws, and from future selections by the State of Alaska and Native Corporations.

ANILCA SECTION 815(1) - CONSERVATION OF NATURAL AND HEALTHY POPULATIONS OF FISH AND WILDLIFE FOR SUBSISTENCE PURPOSES

SEC. 815. Nothing in this title shall be construed as— 16 USC 3125.

(1) granting any property right in any fish or wildlife or other resource of the public lands or as permitting the level of subsistence uses of fish and wildlife within a conservation system unit to be inconsistent with the conservation of healthy populations, and within a national park or monument to be inconsistent with the conservation of natural and healthy populations, of fish and wildlife. No privilege which may be granted by the State to any individual with respect to subsistence uses may be assigned to any other individual;

PROCLAMATION 4626 - YUKON-CHARLEY NATIONAL MONUMENT

[3195-01-M]

Proclamation 4626 **December 1, 1978**

Yukon-Charley National Monument

By the President of the United States of America

A Proclamation

The Yukon-Charley National Monument, an area in east-central Alaska, includes a combination of historic and scientific features of great significance. The Upper Yukon River basin contains historic remains of early mining activity, and includes outstanding paleontological resources and ecologically diverse natural resources, offering many opportunities for scientific and historic study and research.

The area provides breeding habitat for the endangered peregrine falcon, and may produce about one-fourth of the know individuals of the *anatum peregrine* subspecies in its northern habitat. Wildlife also include isolated wild populations of Dall sheep, moose, bear, wolf, and other large mammals. Nearly 200 species of birds, including 20 different raptors, are present in the area.

Geological and paleontological features within the area are exceptional, including a nearly unbroken visible series of rock strata representing a range in geologic time from pre-Cambrian to Recent. The oldest exposures contain fossils estimated to be 700 million years old, including the earliest forms of animal life. A large array of Ice Age fossils occurs in the area.

Within the area is the Charley River basin, parts of which were unglaciated, preserving relict Pleistocene plant communities. The Charley River is considered to be one of the cleanest and clearest of the major rivers in Alaska, and thereby offers excellent opportunities for scientific studies. In the upper Charley River basin, artifacts occur dating back possibly 11,000 years, attesting to the presence of ancient hunters who were the ancestors of the modern Athapascan people.

The land withdrawn and reserved by this Proclamation for the protection of the historical, archeological, biological, geological and other phenomena enumerated above supports now, as it has in the past, the unique subsistence culture of the local residents. The continued existence of this culture, which depends on subsistence hunting, and its availability for study, enhance the historic and scientific values of the natural objects protected herein because of the ongoing interaction of the subsistence culture with those objects. Accordingly, the opportunity for the local residents to engage in subsistence hunting is a value to be protected and will continue under the administration of the monument.

Section 2 of the Act of June 8, 1906 (34 Stat. 225, 16 U.S.C. 431), authorizes the President, in his discretion, to declare by public proclamation historic landmarks, historic and prehistoric structures, and other objects of historic or scientific interest that are situated upon the lands owned or controlled by the Government of the United States to be national monuments, and to reserve as part thereof parcels of land, the limits of which in all cases shall be confined to the smallest area compatible with the proper care and management of the objects to be protected.

NOW, THEREFORE, I, JIMMY CARTER, President of the United States of America, by the authority vested in me by Section 2 of the Act of

June 8, 1906 (34 Stat. 225, 16 U.S.C. 431), do proclaim that there are hereby set apart and reserved as the Yukon-Charley National Monument all lands, including submerged lands, and waters owned or controlled by the United States within the boundaries of the area depicted as the Yukon-Charley National Monument on the map numbered YUCH-90,009 attached to and forming a part of this Proclamation. The area reserved consists of approximately 1,720,000 acres, and is the smallest area compatible with the proper care and management of the objects to be protected. Lands, including submerged lands, and waters within these boundaries not owned by the United States shall be reserved as a part of the monument upon acquisistion of title thereto by the United States.

All lands, including submerged lands, and all waters within the boundaries of this monument are hereby appropriated and withdrawn from entry, location, selection, sale or other disposition under the public land laws, other than exchange. There is also reserved all water necessary to the proper care and management of those objects protected by this monument and for the proper administration of the monument in accordance with applicable laws.

The establishment of this monument is subject to valid existing rights, including, but not limited to, valid selections under the Alaska Native Claims Settlement Act, as amended (43 U.S.C. 1601 *et seq.*), and under or confirmed in the Alaska Statehood Act (48 U.S.C. Note preceding Section 21).

Nothing in this Proclamation shall be deemed to revoke any existing withdrawal, reservation or appropriation, including any withdrawal under Section 17(d)(1) of the Alaska Native Claims Settlement Act (43 U.S.C. 1616(d)(1)); however, the national monument shall be the dominant reservation. Nothing in this Proclamation is intended to modify or revoke the terms of the Memorandum of Understanding dated September 1, 1972, entered into between the State of Alaska and the United States as part of the negotiated settlement of *Alaska v. Morton*, Civil No. A-48-72 (D. Alaska, Complaint filed April 10, 1972).

The Secretary of the Interior shall promulgate such regulations as are appropriate, including regulation of the opportunity to engage in a subsistence lifestyle by local residents. The Secretary may close the national monument, or any portion thereof, to subsistence uses of a particular fish, wildlife or plant population if necessary for reasons of public safety, administration, or to ensure the natural stability or continued viability of such population.

Warning is hereby given to all unauthorized persons not to appropriate, injure, destroy or remove any feature of this monument and not to locate or settle upon any of the lands thereof.

IN WITNESS WHEREOF, I have hereunto set my hand this 1st day of December, in the year of our Lord nineteen hundred and seventy-eight, and of the Independence of the United States of America the two hundred and third.

Jimmy Carter

APPENDIX 6. LIST OF CLAIMS

Yukon-Charley Rivers National Preserve Minerals Data Base

CLAIM NAME	BLM NUMBER	PATENTED/ UNPATENTED	CLAIM TYPE	CLAIM ACRES
Old Holmstrom,Discovery Fraction,etc	F005789	PAT	PLACER	233
Iron Creek 2	FF026926	UNPAT	PLACER	40
Iron Creek 3	FF026927	UNPAT	PLACER	40
Iron Creek 4 Left Fork	FF026928	UNPAT	PLACER	40
Iron Creek 5 Right Fork	FF026929	UNPAT	PLACER	40
2 Alice Gulch	FF026930	UNPAT	PLACER	40
Moose Creek 1	FF026932	UNPAT	PLACER	40
Moose Creek 2	FF026933	UNPAT	PLACER	40
Moose Creek 3	FF026934	UNPAT	PLACER	40
Upper Woodchopper 32	FF026935	UNPAT	PLACER	40
Upper Woodchopper 33	FF026936	UNPAT	PLACER	40
Upper Woodchopper 34	FF026937	UNPAT	PLACER	40
Upper Woodchopper 35	FF026938	UNPAT	PLACER	40
Upper Woodchopper 36	FF026939	UNPAT	PLACER	40
Discovery 1 (4th of July Creek)	FF054345	UNPAT	PLACER	20
1 Above (4th of July Creek)	FF054346	UNPAT	PLACER	20
2 Above (4th of July Creek)	FF054347	UNPAT	PLACER	20
3·Above (4th of July Creek)	FF054348	UNPAT	PLACER	20
July 1 (4th of July Creek	FF054349	UNPAT	PLACER	20
July 2 (4th of July Creek)	FF054350	UNPAT	PLACER	20
Layman 3 (4th of July Creek)	FF054351	UNPAT	PLACER	20
Layman 4 (4th of July Creek)	FF054352	UNPAT	PLACER	20
Layman 5 (4th of July Creek)	FF054353	UNPAT	PLACER	20
Layman 6 (4th of July Creek)	FF054354	UNPAT	PLACER	20
Jay One (4th of July Creek)	FF054355	UNPAT	PLACER	20
Bench 2 (Ben Creek)	FF054356	UNPAT	PLACER	20
South Bench 1 (Ben Creek)	FF054357	UNPAT	PLACER	20
Discovery (Ben Creek)	FF054358	UNPAT	PLACER	20
1 Above (Ben Creek)	FF054359	UNPAT	PLACER	20
2 Above (Ben Creek)	FF054360	UNPAT	PLACER	20
3 Above (Ben Creek)	FF054361	UNPAT	PLACER	20
1 Below (Ben Creek)	FF054362	UNPAT	PLACER	20
2 Below (Ben Creek)	FF054363	UNPAT	PLACER	20
3 Below (Ben Creek)	FF054364	UNPAT	PLACER	20
4 Below (Ben Creek)	FF054365	UNPAT	PLACER	20
5 Below (Ben Creek)	FF054366	UNPAT	PLACER	20
6 Below (Ben Creek)	FF054367	UNPAT	PLACER	20
7 Below (Ben Creek)	FF054368	UNPAT	PLACER	20
8 Below (Ben Creek)	FF054369	UNPAT	PLACER	20
9 Below (Ben Creek)	FF054370	UNPAT	PLACER	20
Discovery (Sam Creek)	FF054371	UNPAT	PLACER	20
1 Above (Sam Creek)	FF054372	UNPAT	PLACER	20
2 Above (Sam Creek)	FF054373	UNPAT	PLACER	20
3 Above (Sam Creek)	FF054374	UNPAT	PLACER	20
4 Above (Sam Creek)	FF054375	UNPAT	PLACER	20
1 Below (Sam Creek)	FF054376	UNPAT	PLACER	20
#1 Discovery	FF061472	UNPAT	PLACER	20
#2 Above Discovery	FF061473	UNPAT	PLACER	20
#3 Above Discovery	FF061474	UNPAT	PLACER	20
#4 Above Discovery	FF061475	UNPAT	PLACER	20
#5 Above Discovery	FF061476	UNPAT	PLACER	20
Upper Woodchopper #1 RT LMT	FF063533	UNPAT	PLACER	40
Upper Woodchopper #2 RT LMT	FF063535	UNPAT	PLACER	40
Upper Woodchopper #2 LFT LMT	FF063536	UNPAT	PLACER	40
Upper Woodchopper #3 RT LMT	FF063537	UNPAT	PLACER	40
Upper Woodchopper #3 LT LMT	FF063538	UNPAT	PLACER	40
Upper Woodchopper #4 RT LMT	FF063539	UNPAT	PLACER	40

Yukon-Charley Rivers National Preserve Minerals Data Base - continued

CLAIM NAME	BLM NUMBER	PATENTED/ UNPATENTED	CLAIM TYPE	CLAIM ACRES
Upper Woodchopper #4 LFT LMT	FF063540	UNPAT	PLACER	40
Upper Woodchopper #5 RT LMT	FF063541	UNPAT	PLACER	40
Upper Woodchopper #5 LFT LMT	FF063542	UNPAT	PLACER	40
Upper Woodchopper #6 RT LMT	FF063543	UNPAT	PLACER	40
Upper Woodchopper #6 LFT LMT	FF063544	UNPAT	PLACER	40
Upper Woodchopper #7 RT LMT	FF063545	UNPAT	PLACER	40
Upper Woodchopper #7 LFT LMT	FF063546	UNPAT	PLACER	40
Upper Woodchopper #8 RT LMT	FF063547	UNPAT	PLACER	40
Upper Woodchopper #8 LFT LMT	FF063548	UNPAT	PLACER	40
Upper Woodchopper #9 RT LMT	FF063549	UNPAT	PLACER	40
Upper Woodchopper #9 LFT LMT	FF063550	UNPAT	PLACER	40
Upper Woodchopper #10 RT LMT	FF063551	UNPAT	PLACER	40
Upper Woodchopper #10 LFT LMT	FF063552	UNPAT	PLACER	40
Upper Woodchopper #11 RT LMT	FF063553	UNPAT	PLACER	40
Upper Woodchopper #11 LFT LMT	FF063554	UNPAT	PLACER	40
Upper Woodchopper #12 RT LMT	FF063555	UNPAT	PLACER	40
Upper Woodchopper #12 LFT LMT	FF063556	UNPAT	PLACER	40
Upper Woodchopper #13 RT LMT	FF063557	UNPAT	PLACER	40
Upper Woodchopper #13 LFT LMT	FF063558	UNPAT	PLACER	40
Upper Woodchopper #14 RT LMT	FF063559	UNPAT	PLACER	40
Upper Woodchopper #14 LFT LMT	FF063560	UNPAT	PLACER	40
Upper Woodchopper #15 RT LMT	FF063561	UNPAT	PLACER	40
Upper Woodchopper #15 LFT LMT	FF063562	UNPAT	PLACER	40
Upper Woodchopper #18	FF063565	UNPAT	PLACER	40
Upper Woodchopper #16 LFT LMT	FF063566	UNPAT	PLACER	40
Upper Woodchopper #16 RT LMT	FF063567	UNPAT	PLACER	40
Upper Woodchopper #17 LFT LMT	FF063568	UNPAT	PLACER	40
Upper Woodchopper #17 RT LMT	FF063569	UNPAT	PLACER	40
Upper Woodchopper Caribou Creek 1	FF063570	UNPAT	PLACER	40
Upper Woodchopper Caribou Creek 2	FF063571	UNPAT	PLACER	40
Upper Woodchopper Caribou Creek 3	FF063572	UNPAT	PLACER	40
Upper Woodchopper Caribou Creek 4	FF063573	UNPAT	PLACER	40
Upper Woodchopper Caribou Creek 5	FF063574	UNPAT	PLACER	40
Upper Woodchopper Caribou Creek 6	FF063575	UNPAT	PLACER	40
Upper Woodchopper Caribou Creek 7	FF063576	UNPAT	PLACER	40
Upper Woodchopper Caribou Creek 8	FF063577	UNPAT	PLACER	40
Upper Woodchopper Caribou Creek 9	FF063578	UNPAT	PLACER	40
Upper Woodchopper Caribou Creek 10	FF063579	UNPAT	PLACER	40
Upper Woodchopper Caribou Creek 11	FF063580	UNPAT	PLACER	40
Upper Woodchopper Caribou Creek 12	FF063581	UNPAT	PLACER	40
Upper Woodchopper #19	FF063582	UNPAT	PLACER	40
Upper Woodchopper #20	FF063583	UNPAT	PLACER	40
Upper Woodchopper #21	FF063584	UNPAT	PLACER	40
Upper Woodchopper #22	FF063585	UNPAT	PLACER	40
Upper Woodchopper #23	FF063586	UNPAT	PLACER	40
Upper Woodchopper #24	FF063587	UNPAT	PLACER	40
Upper Woodchopper #25	FF063588	UNPAT	PLACER	40
Upper Woodchopper #26	FF063589	UNPAT	PLACER	40
Upper Woodchopper #27	FF063590	UNPAT	PLACER	40
Upper Woodchopper #28	FF063591	UNPAT	PLACER	40
Upper Woodchopper #29	FF063592	UNPAT	PLACER	40
Upper Woodchopper #30	FF063593	UNPAT	PLACER	40
Upper Woodchopper #31	FF063594	UNPAT	PLACER	40
#4 Above Mary Flow	FF063595	UNPAT	PLACER	40
#3 Above Mary Flow	FF063596	UNPAT	PLACER	40
#2 Above Mary Flow	FF063597	UNPAT	PLACER	40
#1 Above Mary Flow	FF063598	UNPAT	PLACER	40
Kelly	FF063599	UNPAT	PLACER	20
#1 Below Cavanaugh Disc	FF063600	UNPAT	PLACER	20
Cavanaugh Discovery	FF063601	UNPAT	PLACER	20
#2 Below Cavanough Disc	FF063602	UNPAT	PLACER	20
#3 Below Cavanough Disc	FF063603	UNPAT	PLACER	20

Yukon-Charley Rivers National Preserve Minerals Data Base - continued

CLAIM NAME	BLM NUMBER	PATENTED/ UNPATENTED	CLAIM TYPE	CLAIM ACRES
Kay Assoc.	FF063604	UNPAT	PLACER	40
Mary Flow Claim	FF063605	UNPAT	PLACER	40
#3 Above Discovery	FF063606	UNPAT	PLACER	20
#2 Above Discovery	FF063607	UNPAT	PLACER	20
#2 Below Mary Flow	FF063608	UNPAT	PLACER	20
Gladys	FF063609	UNPAT	PLACER	20
#4 Below Cavanough Disc	FF063610	UNPAT	PLACER	20
Joe	FF063611	UNPAT	PLACER	20
#3 Below Mary Flow	FF063612	UNPAT	PLACER	20
#1 Above Disc Woodchopper Creek	FF063613	UNPAT	PLACER	20
#4 Below Mary Flow	FF063614	UNPAT	PLACER	20
Bodacious	FF063615	UNPAT	PLACER	20
Discovery on Woodchopper Creek	FF063616	UNPAT	PLACER	20
#1 on Iron Creek	FF063617	UNPAT	PLACER	20
#1 Above Discovery	FF063618	UNPAT	PLACER	20
Anna May Claim	FF063619	UNPAT	PLACER	20
Woodchopper Bench	FF063620	UNPAT	PLACER	40
Charles Claim	FF063621	UNPAT	PLACER	20
#1 Below Disc Mineral Creek	FF063622	UNPAT	PLACER	20
Discovery on Mineral Creek	FF063623	UNPAT	PLACER	20
#1 Above on Mineral Creek	FF063624	UNPAT	PLACER	20
#2 Above on Mineral Creek	FF063625	UNPAT	PLACER	20
#3 Above on Mineral Creek	FF063626	UNPAT	PLACER	20
#4 Above on Mineral Creek	FF063627	UNPAT	PLACER	20
#1 Left Fork	FF063628	UNPAT	PLACER	20
#1 Alice Gulch	FF063629	UNPAT	PLACER	20
Seward Assoc	FF063630	UNPAT	PLACER	40
Nugget	FF063631	UNPAT	PLACER	40
Slate	FF063632	UNPAT	PLACER	20
Jumbo Fraction	FF063633	UNPAT	PLACER	20
Homestake	FF063634	UNPAT	PLACER	20
Montana Claim #1	FF063635	UNPAT	PLACER	20
Yukon	FF063636	UNPAT	PLACER	20
#2 Below Kodiak	FF063637	UNPAT	PLACER	20
Michigan	FF063638	UNPAT	PLACER	20
Ohio	FF063639	UNPAT	PLACER	20
California	FF063640	UNPAT	PLACER	20
Idaho	FF063641	UNPAT	PLACER	20
Oregon	FF063642	UNPAT	PLACER	20
Tanana	FF063643	UNPAT	PLACER	20
Kansan	FF063644	UNPAT	PLACER	20
#1 Below Kansan	FF063645	UNPAT	PLACER	20
#2 Below Kansan	FF063646	UNPAT	PLACER	20
#3 Below Kansan	FF063647	UNPAT	PLACER	20
#4 Below Kansan	FF063648	UNPAT	PLACER	20
#5 Below Kansan	FF063649	UNPAT	PLACER	20
#6 Below Kansan	FF063650	UNPAT	PLACER	20

APPENDIX 7. CULTURAL RESOURCES PROGRAMMATIC AGREEMENT

**Advisory
Council On
Historic
Preservation**

The Old Post Office Building
1100 Pennsylvania Avenue, NW, #809
Washington, DC 20004

Reply to: 730 Simms Street, Room 450
Golden, Colorado 80401

Alaska [illegible] Office
JUN 27 '8

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June 24, 1988

Mr. Richard J. Stenmark
Acting Alaska Regional Director
National Park Service
Room 107
2525 Gambell Street
Anchorage, AK 99503-2892

REF: Memorandum of Agreement regarding mining operations in the National Parks in Alaska

Dear Mr. Stenmark:

The enclosed Memorandum of Agreement has been accepted by the Council. This document constitutes the comments of the Council required by Section 106 of the National Historic Preservation Act and the Council's regulations. Copies of this letter and the ratified Agreement have also been sent to the Alaska State Historic Preservation Officer.

The Council appreciates the way in which your staff members have briefed us on this matter and kept us informed as the Agreement was developed.

Sincerely,

Robert Fink
Chief, Western Division
of Project Review

ARO-RCR-1-2

PROGRAMMATIC AGREEMENT
AMONG
NATIONAL PARK SERVICE, ALASKA REGION
ALASKA STATE HISTORIC PRESERVATION OFFICER
ADVISORY COUNCIL ON HISTORIC PRESERVATION

REGARDING MINING OPERATIONS IN ALASKA NATIONAL PARKS

WHEREAS, the National Park Service (NPS), Alaska Region proposes to implement a minerals management program under which Plans of Operations may be approved for valid mining claims in the national parks and preserves in Alaska; and,

6/23/88
6/22/
8/5/88

WHEREAS, the Alaska Region recognizes that the lands and material affected by this process may contain properties which are included in or may be eligible for inclusion in the National Register of Historic Places (National Register) and,

WHEREAS, the Alaska Region plans to implement the management program, and at the same time wishes to ensure that reasonable and prudent actions are taken to protect the integrity of historic and cultural properties which may be eligible for inclusion in the National Register; and,

WHEREAS, the Alaska Region, in consultation with the State Historic Preservation Officer of Alaska (SHPO), has determined that implementation of this program could have an adverse effect upon such historic and cultural properties that are included or may be eligible for inclusion in the National Register; and,

WHEREAS, pursuant to Section 106 of the National Historic Preservation Act of 1966 (16 U.S.C. Sec. 470f, as amended, 90 Stat 1320), the Alaska Region of NPS has requested the comments of the Advisory Council on Historic Preservation (Council); and,

WHEREAS, pursuant to the regulations of the Council (36 CFR Part 800), representatives of the Council,the Alaska SHPO and the Alaska Region of the NPS have consulted to consider feasible and prudent alternatives to avoid or satisfactorily mitigate potential adverse effects to properties that are included or may be eligible for inclusion in the National Register;

NOW, THEREFORE, it is mutually agreed that implementation of the minerals management process in accordance with the following stipulations will avoid or satisfactorily mitigate any reasonably foreseeable adverse effects:

STIPULATIONS

The National Park Service will insure that the following measures are carried out:

I. INVENTORY

An identification program as specified in Appendix A and acceptable to the Alaska SHPO will be implemented. The inventory program will address all areas of possible disturbance due to the permitted mining activities including areas of direct and indirect or secondary impacts. This program will identify historical properties on the patented and unpatented mining claims located in National Parks in Alaska. As appropriate, the identification program will be carried out in consultation with local traditional spiritual leaders in order to assure that any cultural sites eligible for the National Register are identified. The intent of the identification program shall be to complete an inventory containing sufficient information to permit an efficient evaluation of effects on historical properties of the implementation of proposed Plans of Operation, nomination of eligible historical properties to the National Register, and efficient completion of the Determination of Eligibility process when necessary. The Alaska SHPO will be provided copies of all site forms resulting from this inventory for inclusion on the Alaska Heritage Resources Survey.

II. EVALUATION OF HISTORICAL PROPERTIES

A. An ongoing program of evaluation and nomination of historical properties to the National Register shall be undertaken in consultation with the Alaska SHPO. Determinations of Eligibility for historical properties will be undertaken in consultation with the Alaska SHPO as required for management of mining in the National Parks in Alaska. Until the Determination Of Eligibility evaluation program is completed, NPS will treat all historic properties as potentially eligible for inclusion on the National Register for purposes of assessing the effects of approval of mining Plans of Operation.

B. Every year that there is minerals management activity, NPS will file an Annual Report by March 15 of the following calendar year, compiling mining activity data, site evaluations, and all NPS compliance decisions involving the mining program for the year covered by the report, as specified in this PA.

Additionally, by October 1st , immediately following the field season, NPS will provide the SHPO with adequate data from the mining program to complete the "SHPO End of Year Report" for NPS.

III. REVIEW OF MINING PLANS OF OPERATION

A. No mining Plan of Operations will be approved until inventory and evaluation of historical sites in the area of the proposed operations has been completed in accordance with Stipulations I and II of this PA.

B. If no sites are identified or if sites are determined not eligible for the National Register during the evaluation process, NPS will approve the mining Plan of Operations and maintain a file documenting that determination and including it in the Annual Report to the SHPO.

C. If eligible historic properties are identified in the area of the undertaking but:

1. it is determined that there will be no effect because there will be no physical or visual impacts to those sites, NPS will approve the mining Plan of Operations and maintain a file documenting that determination and including it in the Annual report to the SHPO.
2. it is determined that there will be an effect on the historic properties but that it will not be adverse (ie. a no adverse effect), under the actions listed in Appendix B of this Agreement, NPS will approve the mining Plan of Operations, maintain a file documenting that determination and include it in the Annual Report to the SHPO.
3. if the determination is that there will be a no adverse effect but it is not covered under the list of actions in Appendix B, NPS will notify the SHPO and provide 10 working days for objections by the Alaska SHPO before approving the mining Plan of Operations. The letter of transmittal will notify the SHPO that it is forwarded in accordance with this Programmatic Agreement.

Where possible, NPS will place stipulations in the final mining Plan of Operations to assure that there will be no adverse effects to historic properties. NPS will monitor adherence to the Plans of Operations involving cultural sites several times during the mining season.

D. If it is determined that there are unavoidable direct or visual impacts to eligible historical properties, NPS will consult with the Alaska SHPO to develop a mitigation plan for the affected properties. The mitigation plan will be implemented prior to commencement of the mining in accordance with the mining Plan of Operations. Development of each mitigation plan will take into account, as appropriate, the recommended standards, procedures and guidelines in:

1. ACHP "Treatment of Archaeological Properties: A Handbook"
2. "Archaeology and Historic Preservation: Secretary of the

Interior's Standards and Guidelines"
3. ACHP "Manual of Mitigation Measures" (MOMM)
4. NPS "Cultural Resources Management Guideline" (NPS-28)

Each mitigation plan developed, as well as sufficient documentation to permit reasoned review on the plan, will be forwarded to the Council for review. The letter forwarding the mitigation plan will notify the Council that it is forwarded in accordance with this Programmatic Areement. The Council will have 10 working days to object. This requirement may be dropped with the mutual consent of the consulting parties.

IV. DISCOVERY SITUATIONS

All approvals of Plans of Operations for mining and access to mining areas will contain a stipulation that in the event of the discovery of previously unknown cultural resources during mining operations, the operator will immediately cease any operations that could impact that resource, take necessary positive steps to protect that resource, immediately notify the Superintendent of that Park. The Superintendent will evaluate the discovery and will determine within ten (10) working days what action will be taken. Any mitigation plan will be developed and implemented in consultation with the Alaska SHPO.

V.. PROFESSIONAL QUALIFICATIONS

Any NPS and/or contract personnel supervising implementation of this Agreement shall meet at least the minimum professional qualifications detailed in "Archeology and Historic Preservation: Secretary of the Interior's Standards and Guidelines" and NPS-28.

VI. NATIONAL HISTORIC LANDMARKS

This Agreement is not applicable to adverse effects on National Historic Landmarks. NPS will obtain the Council's comments on those historical properties in accordance with the Council's regulations (36 CFR 800.10).

VII. MONITORING OF MINING PLANS OF OPERATIONS

The NPS will monitor the mining operations that potentially involve impacts to historical properties several times each mining season in order to ensure that the approved Plans of Operations, including any mitigation plans, are followed.

VIII. MONITORING OF THE EFFECTIVENESS OF THE PROGRAMATIC AGREEMENT

The NPS, on the basis of its experience implementing this Agreement, will biennially assess the effectiveness of the Agreement and compile a report of that assessment. This report will be made available to the consulting parties and will include any recommendations necessary to assure that the Agreement is as efficient and effective as possible and that the NPS is able to comply with its requirements.

IX. SUSPENSION OF THE AGREEMENT

Any party to this agreement may suspend it by written notice to the other consulting parties. If this happens the parties will consult further in order to determine whether the issues can be resolved and the Agreement reimplemented in amended form.

X. DISPUTE RESOLUTION

If a dispute arises regarding implementation of the Agreement, the NPS will consult with the objecting party to resolve the dispute. If the consulting parties determine that the dispute cannot be resolved, the NPS shall request the further comments of the Council pursuant to the Council's regulations.

XI. AMENDMENT OF THE AGREEMENT

If any signatory to this Agreement determines that the terms of the Agreement cannot be met or believes that a change is necessary, that signatory shall immediately request that the consulting parties consider an amendment or addendum which will be executed in the same manner as the original Agreement.

XII. FAILURE TO CARRY OUT THE TERMS OF THIS AGREEMENT

Failure to carry out the terms of this Agreement would require that the NPS again request the Council's comments in accordance with 36 CFR Part 800. If the NPS cannot carry out the terms of the Agreement, it will not take or sanction any action or make any irreversible commitment that would result in an adverse effect with respect to the historical property covered by the Agreement or would foreclose the Council's consideration of modifications or alternatives that could avoid or mitigate the adverse effect on the historical property until the commenting process has been completed.

Execution of this Programmatic Agreement and carrying out its terms evidences that the National Park Service has satisfied its Section 106 responsibilities for all individual undertakings of the program.

ADVISORY COUNCIL ON HISTORIC PRESERVATION

BY: DATE: 6/22/88

Name: John F. W. Rogers
Title: Chairman

NATIONAL PARK SERVICE

BY: DATE: 5/24/88

Name: Richard J. Stenmark
Title: Acting Regional Director, Alaska

ALASKA HISTORIC PRESERVATION OFFICER

BY: Judith E Bittner DATE: 5/25/88

Name: Judith E. Bittner
Title: State Historic Preservation Officer

APPENDIX A

NPS CULTURAL RESOURCE MINING COMPLIANCE INVENTORY PROCEDURES

Mineral management regulations for all valid existing mining claims, under the 1872 Mining Law, within the National Park System are governed by NPS Regulations at 36 CFR 9A. These regulations require that "Prior to approval of a plan of operations, the Regional Director shall determine whether any properties included in, or eligible for inclusion in, the National Register of Historic Places or National Registry of National Landmarks may be affected by the proposed activity. This determination will require the acquisition of adequate information, such as that resulting from field surveys, in order to properly determine the presence of and significance of cultural resources within the area to be affected by mining operations" (36 CFR 9.10 (e)). In order to achieve this mandate an inventory process, consisting of literature review and research, intensive pedestrian surveys, and evaluation of findings, has been initiated. The following details the inventory procedures:

Relevant material will be reviewed prior to the field investigations. These include: pertinent historical literature, U.S.G.S. Reports, ethnographic sources, Alaska Heritage Resources Survey files, paleoenvironmental data, geologic information, floral and faunal data (including animal migration studies), and previous archaeological studies conducted within or adjacent to the areas under investigation. Additionally, the project historian has assembled a resource library on mining history and technology for use by project personnel.

Prior cultural resources surveys have so far failed to produce enough relevant data upon which to formulate an adequate predictive model for this project. Therefore, to insure full legal compliance, and complete the inventory of all historic properties, one hundred percent coverage of all valid mining claims will be conducted. This will ensure that regardless of the scope of any mining Plans of Operations that may be submitted to NPS for evaluation in the future, all historic properties will receive appropriate protection.

The areas of investigation are all placer and lode claims, and park-designated access routes, contained within the Alaska National Parks and Preserves. The basic survey universe consists of placer claims which are normally 1320 feet by 660 feet (20 acres) and lode claims, (although of a different configuration), which also cover an area of approximately 20 acres. Most placer claims are contiguous and normally follow a water course. However, on any particular drainage the number and length of valid mining claims are dependent on the geological deposition of the precious metals, and may vary from a single claim to association groups extending for miles in length. To insure that no historic properties may be impacted by possible secondary effects of mining, such as erosion prior to required reclamation, survey coverage may often extend well beyond the valid posted claim boundaries. However, this extended coverage is normally adjacent to claims and contingent on local topographic features or associated known sites. Where appropriate, or necessary for historical perspective, other areas outside of valid mining claims may also be investigated. Access routes, designated by the Park Superintendents in accordance with 36 CFR 1.5, will also be examined to insure that no historic properties would be affected by road use.

Typical survey coverage will be "Intensive" as defined by the Secretary of the Interior's Standards and Guidelines. This will consist of a pedestrian survey of the claim and adjacent areas sufficient to insure that all surface cultural resources within the area of examination will be located. Survey procedures will include examination for cultural manifestations on surface areas and cutbanks, road cuts, bear diggings, and earlier mining exposures.

Previous archaeological investigations within Alaska's interior region indicate that certain land forms or topographic situations have a higher probability for containing archaeological sites. These areas include: high overlooks, terraces adjacent to lakes and streams, natural constrictions, caves, and higher areas adjacent to tree lines. Subsurface probes will be placed in those areas determined to contain high site potential. Crew transect spacing will vary depending on previous ground disturbance, surface visibility and vegetation.

Areas that would not be examined include locations deemed to be unsafe, such as adits, areas containing hazardous waste, slopes greater than 30 degrees, and areas of standing water. In the event that mining plans of operations include work within previously opened adits, cultural resource personnel will work closely with NPS mining engineers to insure that all historic properties are inventoried and evaluated.

Survey crews will be composed of cultural resources professionals rated at the GS-9 and GS-7 levels. The crew chief/supervisor will be a professional, with at least a masters degree in an appropriate field. Several field archaeologists, an historian, and where appropriate, such as documenting a large mining complex, an historical architect. Professional qualifications for crew members are those requirements outlined in OPM Personnel Management Handbook X-118; which require at least a Bachelors degree and/or appropriate experience in the required professional field for a GS-7 level appointment. All fieldwork will be reviewed by the appropriate professionals in the regional Division of Cultural Resources.

Inventory documentation will consist of the following:

1). Field notebooks: required of all crew members. Includes daily log and work schedules, as well as first line survey and site data that includes complete site descriptions, locations, maps, field evaluations, and boundaries.
2). Survey Summary Form; detailing all areas surveyed, procedures, boundaries, sites recorded, including mapping detailed survey coverage and results on aerial photographic overlays, NPS mining maps and USGS 1:63,000 maps
3). Cultural isolate object list; used to record isolated objects that have been determined not to qualify for site documentation status. These include such items as shovel fragments, small fragmented equipment items, flume fragments and other items that have no integrity. All isolate items are photographed and noted on USGS maps.
4). Cultural Resource Site Forms; details site designation, location, description, cultural materials and features, boundaries, field evaluation, references, and have attached photographic log, site sketch, and location map.
5). Master site and survey coverage maps are on file at the NPS Regional Office.

Copies of all site information are forwarded to the State Office Of History and Archaeology for permanent site identification numbers and inclusion in the Alaska Heritage Resources Survey.

EVALUATION OF DATA

The data collected by the field crews will be evaluated by qualified professionals who have at least a Masters Degree. The archaeological sites will be evaluated by a qualified archaeologist, while the historical sites will be evaluated by a historian who has experience doing site specific surveys and evaluations. The site evaluations will be based on a combination of the data obtained from the field work and professional-level research. For historical sites, the professional evaluation will include sufficient research to put together short, historical overviews of each mining district and drainage histories for each drainage where sites have been located. The overviews and drainage histories will help identify who created and used the sites, and provide the historic context to determine the significance of the sites. In determining the significance of the sites, all four of the criteria for eligibility for the National Register (#A-#D) will be considered in evaluating each site. Relevant portions of data from each site will be entered into a data base information system. This information system, the drainage histories, and the written evaluations of each site will all be utilized for Section 106 actions and to assist the park units in developing long-term management plans for the sites. Preliminary Determinations of Eligibility for all sites located by the survey crews will be done. The appropriate National Register nominations will be done after the completion of the active inventory program.

APPENDIX B

Permitted conditions and actions that allow a No Adverse Effect determination without consultation with the Alaska SHPO:

1. Avoidance by establishment of a sufficient buffer zone to protect the qualities that qualified the property for the National Register.
2. No permanent physical or visual impacts that would impair the qualities that qualified the property to the National Register. In some instances the reclamation program would restore those qualities.
3. Disturbance is only to nonhistoric materials such as modern structures or improvements. The integrity of the site would remain unimpaired.
4. There is a continuation of historic mining activities that will not impact the qualities that made the property eligible, provided that it does not impact structures or archaeological sites.

DOCUMENTATION

The Mining in the Parks Act (Public Law 94-429) resulted in the promulgation of regulations (36 CFR 9A) to manage mining activities associated with mining claims located within National Park System (NPS) units in such a manner so as to prevent or minimize damage to the environment and other resource values. These regulations require approval of Plans of Operations by the Regional Director (NPS) prior to any activity on a claim, including access to that claim. The approval process requires full evaluation, through a formal Environmental Assessment of an applicant's Plan. Since the approval by NPS constitutes a Federal action, compliance with the National Historic Preservation Act,as amended, and its implementing regulations is a necessary part of the process.

The following is a description of the potential impacts to prehistoric and historic resources associated with mining development and production activities in Alaska's National Parks.

Some placer mining operations and associated activities are of such magnitude that they pose an immediate threat to any prehistoric or historic site in the area of the mining claim and often to sites outside the claim. Placer mining operations on low-lying stream-based deposits (the typical situation in Alaska) will probably affect archaeological sites located on stream terraces, stream banks, stream confluences, knolls, hilltops, hill benches, and on significant contour features nearby rather than in the stream bed itself. Historic sites, on the other hand, which often are associated with past mining activity are found on these landforms as well as in the stream bed. All mining areas with these features should be intensively surveyed for sites when mining operations or related activities are proposed in their vicinity.

Bulldozing or backhoe excavations and blasting are the most obvious and immediate causes of site destruction or disturbance. Any activities that alter the spatial relationship of surface artifacts, structures, or the "setting" of the artifacts in the ground (site context), as well as the historic scene can effectively destroy a site's scientific value.

Building a mining access route can completely destroy a site during construction and use by heavy equipment; it also can provide access to sites that would normally be difficult to visit. Access to sites increases their vulnerability to potting and illegal collecting.

Other less apparent but possible sources of site disturbance include the destruction of the protective vegetation cover, which can lead to site erosion by wind,water and cryoturbation; and the contamination of sites through chemical or petroleum spills (such as can occur in a cyanide leaching operation).

Secondary impacts can result from downstream erosion due to increased particle loads in stream water, vibration from mining operations, illegal collecting and souvenir hunting, channel diversion effects, and the general impacts from increased human presence and use of an area.

The typical claim in Alaska's parks is a 20 acre placer claim. An operation usually has five or more claims strung along a single drainage. Mining is usually a small scale endeavor, often by just one family at a time, utilizing a bulldozer and frontend loader, with ore processing taking place onsite. Access is usually by trail in the winter with actual mining confined to the summer months of June through mid-September.

SUMMARY: POTENTIAL EFFECTS OF MINING ON CULTURAL RESOURCES

Mining:

- excavation (overburden removal, drilling, blasting)
- access roads
- material source borrow areas
- water diversion channels
- staging areas
- camps and storage

Effect:

- obliteration of all or part of a site through
  - exposure of a buried site
  - strata disruption
  - changes in artifact condition
  - destruction of artifacts
  - alterations in erosional patterns
  - loss of context of materials, artifacts, etc.
  - destruction of historic structures and objects

Human Activity:

Effect:

- increased potential for discovery and disturbance
  - looting of sites.
  - trampling
  - vehicular disturbance -direct and indirect(vibration, etc)
  - site covering through dumping of trash, tailings, overburden
  - animal damage due to attraction of human camps

Emergency:

- environmental cleanup procedures due to flooding, fire, fuel spills, etc

Effect:

- disturbance or contamination of sites and artifacts

Reclamation procedures:

- stabilization
- revegetation
- recontouring
- water quality measures
  - settling ponds
  - filtration plants

Effect:

- if undisturbed areas are involved, the effects listed under Mining apply.

The NPS recognizes the need to develop a comprehensive cultural resources data base for the more than 2000 mining claims, covering about 40,000 acres, in scattered locations in eight of Alaska's National Parks. In response to this need, NPS has developed and implemented a multiyear, multidisciplinary (history, archaeology and historical architecture) cultural resources field reconnaissance program that will inventory all valid mining claims and the access routes to them. The data derived from this inventory will be of sufficient quality to allow Determinations of Eligibility for placement in the National Register of Historic Places.

An Historic Resources Study (as defined in NPS-28) titled "Mining in Alaska's National Parks" has been initiated that will provide a specific framework for evaluating the significance of the historic mining resources that occur on many of the claims and that are the most numerous of the cultural resources that are likely to be impacted by the NPS minerals management program. A Branch of Mining Compliance has been established within the Division of Cultural Resources in the Alaska Regional Office in order to ensure that NPS has the permanent staff, resources, capability and commitment to fulfill its obligations for management of cultural resources and compliance with Section 106, and Section 110 of the National Historic Preservation Act and the Council's regulations (36 CFR Part 800).

The field inventory will focus on stream drainages containing mining claims, using them as the basic unit of survey. In most cases, the complete stream drainage will be surveyed, even when the mining claims do no cover the whole drainage. This will allow for coverage of secondary impact zones as well as all direct impact areas. All designated access roads (to which all access will be confined by NPS policy) to each area will also be surveyed, including sufficient buffer zones on each side of the routes.

An intensive archaeological survey, including series of shovel test probes, will be done on all direct impact areas, excluding places that have been previously disturbed, or that are of such an altitude or slope angle (greater than 30 degrees), as to have extremely low site potentials. The survey will concentrate on those topographic features that have shown high site potential or visibility in the past. Those features will receive 100% coverage. Areas of lower site potential and/or visibility will receive a less intensive level of coverage.

Historic site areas will be mapped, photographed, surveyed for their boundaries, integrity and major and minor features. Field survey results will be incorporated into the Historic Resources Study that is being done as part of this inventory and evaluation. Each survey team will have at least one professional historian (Masters level) and one historical architect (HABS level) in the field with the archaeology team.

APPENDIX 8. MEMORANDUM OF GROSS VALUE ESTIMATE, PATENTED AND UNPATENTED MINING CLAIMS, YUKON-CHARLEY RIVERS NATIONAL PRESERVE ALASKA

Prepared for: National Park Service
Alaska Regional Office

Date of Valuation: November 1, 1988

Appraiser: Norman H. Lee

APPENDIX 8
Memorandum of Gross Value Estimate, Patented and Unpatented Mining Claims

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Memorandum of Gross Value Estimate, Patented and Unpatented Mining Claims

SUMMARY OF IMPORTANT FACTS AND CONCLUSIONS

Property Value

Gross estimate of fee values of patented and unpatented mining claims in the Yukon-Charley Rivers National Preserve.

Total Area Valued

233.445 acres, more or less, patented
4,920 acres, more or less, unpatented

Date of Valuation

November 1, 1988

Final Gross Value Estimate--Patented

$1,500,000.00 to $2,000,000.00

Final Gross Value Estimate--Unpatented

$2,000,000.00 to $3,5000,000.00

Norman H. Lee

Chief Appraiser

National Park Service, Alaska Region

PURPOSE OF THE REPORT

The purpose of this report is to identify the range of fair market value of patented and unpatented mining claims located in Yukon-Charley Rivers National Preserve.

DEFINITION OF TERMS

The market value concept used in this report is defined as follows:

> "The amount in cash, or on terms reasonably equivalent to cash, for which in all probability the property would be sold by a knowledgeable owner willing but not obligated to sell to a knowledgeable purchaser who desires but is not obligated to buy."

Fee-simple-estate includes the contributing value of all property rights, including minerals in-situ.

USE OF THIS ESTIMATE

This report should be used only as an estimate of value to be used in planning, public documents, environmental impact statement, and funding requests. It does not reflect the accuracy conducive to a detailed analysis of all the market data utilized in a fully supported narrative appraisal.

The report is not intended as, and must not be used as, a basis for making offers to purchase the subject real property.

CONTINGENT AND LIMITING CONDITIONS

No surveys were made by the appraiser and all supplied measurements are believed to be reasonably correct.

The appraiser assumes no legal responsibility for title opinion. No title evidence was supplied.

Title to the estate is considered to be free and clear of encumbrances and is under responsible ownership and competent management.

Information furnished by others has been checked for accuracy and is assumed to be correct.

The report has been prepared for a definitely defined purpose and is to be considered in its entirety. The distribution of value between various parcels of land, and buildings, applies to the stated program of utility, and is invalid if used in any other context.

Inspection of the subject properties was not made. This report is based on information supplied by other park service personnel, photographs, and topographic maps.

There are very specific requirements for a narrative appraisal report leading to an estimate of "Fair Market Value." These requirements are contained in the **Uniform Appraisal Standards for Federal Land Acquisitions.** This report is only a Memorandum of Gross Value Estimate and DOES NOT meet the requirements for an appraisal report leading to a supported estimate of "Fair Market Value" for purposes of acquisition. This report is intended only for administrative purposes.

REFERENCES

State of Alaska
Land Records and Recording

Ben Olson, Appraiser
Bureau of Land Management
Anchorage, Alaska

Douglass B. Trosper, Appraiser
Bureau of Indian Affairs
Anchorage, Alaska

Dennis L. Lattery, Appraiser
State of Alaska
Anchorage, Alaska

Chris Guinn, Appraiser
Bruce Street and Associates
Fairbanks, Alaska

Rex E. Daugherty, Chief Appraiser
Pacific Northwest Region
National Park Service
Seattle, Washington

Don Chase, Superintendent
Yukon-Charley Rivers National Preserve
Eagle, Alaska

Mining Claim Field Inventory
Mining and Minerals Branch
Alaska Regional Office
National Park Service
Anchorage, Alaska

APPENDIX 8
Memorandum of Gross Value Estimate, Patented and Unpatented Mining Claims

VALUATION PREMISE

Due to time constraints, physical conditions on the ground (e.g., snow cover, etc.), and lack of permission from absentee owners, physical inspection was not made of these properties.

This memorandum is intended as an estimate of value to be used in planning, public documents, environmental impact statements, and funding requests. The memorandum does not reflect the accuracy of a fully supported narrative appraisal. In addition, groups of claims are lumped together so individual ownerships are not valued.

The property descriptions are based on interviews with NPS staff, aerial photographs, various reports, topographic maps, and my general knowledge of the area.

A detailed comparison of comparable sales and subject tracts has not been made. The value estimates are based on my experience in valuing lands in the Alaskan real estate market and a cursory review of related information.

This Memorandum of Gross Value Estimate report is not intended as a basis or making offers to purchase the subject real property.

PROPERTY DESCRIPTION - Patented Claims

Woodchopper Creek Claims include 233.445 acres. The claims follow Woodchopper Creek. About sixty percent (60%) of the area is old placer tailings. The balance is gently sloping. There is a small airstrip and a rough four-wheel drive road providing access to the Yukon River. This is a partially wooded area.

GROSS VALUE ESTIMATE - PATENTED CLAIMS

$1,500,000.00 to $2,000,000.00

GROSS VALUE ESTIMATE - UNPATENTED CLAIMS

$2,000,000.00 to $3,500,000.00

(4)

QUALIFICATIONS OF APPRAISER

Name: Norman H. Lee

Year of Birth: 1942

Education: University of Wisconsin, Stevens Point, 1970, B. S. Degree

Special Real Estate and Appraisal Courses:

University of Tennessee
  Real Estate Appraisal, 1971
  Real Estate Law, 1971

American Society of Farm Managers and Rural Appraisers
  Rural Appraisal School, 1971
  Condemnation Appraisal School, 1973
  Ranch Appraisal School, 1976
  Minerals Appraisal School, 1981
  Advanced Ranch Appraisal School, 1983

American Institute of Real Estate Appraisers
  Course IA, 1977
  Review Appraiser Course, 1978
  Rural Appraisal Course, 1979

Society of Real Estate Appraisers
  Course 201, 1980

Numerous in-house appraisal and real estate training sessions.

Experience:

April 1987 to Present
Chief Appraiser, National Park Service, Alaska Region; Anchorage, Alaska.

April 1986 to April 1987
Review Appraiser, U. S. Army Corps of Engineers, Omaha District; Omaha, Nebraska.

January 1986 to April 1986
District Appraiser, California Desert District, Bureau of Land Management; Riverside, California.

June 1981 to January 1986
Zone Appraiser, Region 1, U. S. Forest Service; Butte and Helena, Montana.

April 1978 to June 1981
Chief Appraiser, Flathead Wild and Scenic River Project, Region 1, U. S. Forest Service; Kalispell, Montana.

April 1975 to April 1978
Regional Supervisory Appraiser, Lower Missouri Region, Bureau of Reclamation; Denver, Colorado.

July 1970 to April 1975
Appraiser, Upper Missouri Region, Bureau of Reclamation, North Dakota and South Dakota.

Appraisal experience includes a variety of improved and unimproved properties. Appraisals have been completed for partial and total acquisitions. Partial acquisition appraisals have covered fee and easement valuations. Easement valuations include electric transmission lines, scenic easements, buried pipelines, canals, irrigation ditches, and road rights-of-way. Appraisals have included commercial buildings, urban lands, urban transitional, suburban, rural transitional, minerals, timberlands, cropland, grazing, recreational lands, and guest ranches. Appraisal assignments in North Dakota, South Dakota, Iowa, Minnesota, Wyoming, Colorado, Nebraska, Montana, Idaho, California, and Alaska. Reviewing and staff appraiser since April 1975.

Specialized Skills:

Instructor, Real Estate Courses, Montana College of Mineral Science and Technology, Butte, Montana, September 1981 to January 1984

Instructor, Appraisal Courses, International Right-of-Way Association. (Taught courses in Montana, Washington, Alaska, Minnesota, and Wisconsin), October 1982 to Present

Expert Witness--Federal District Court, Colorado (Valuation witness on fee, partial acquisition, and easement values)

Professional Memberships:

American Society of Farm Managers and Rural Appraisers

International Right-of-Way Association

APPENDIX 9. MINING CLAIM ACQUISITION CRITERIA FOR STRENGTHENED CLAIM ACQUISITION PROGRAM FOR ALTERNATIVE C

To protect critical park resources and values, and preclude incompatible development of the surface of patented mining claims, the National Park Service would implement a program to acquire certain patented and valid unpatented mining claims in advance of proposed mining activities in accordance with criteria presented below. This strengthened claim acquisition program would be in addition to the acquisition of individual claims that may be necessary for compliance with the standards of 36 CFR Subpart 9A, section 9.10 or the acquisition of mining claims offered by an owner.

NPS WOULD SEEK TO ACQUIRE CLAIMS UPON DETERMINING WHETHER MINING AND MINING-RELATED ACTIVITY ON THE CLAIMS, IF APPROVED, WOULD THREATEN OR MAY OTHERWISE ADVERSELY AFFECT THE ECOLOGICAL OR CULTURAL RESOURCES OF THE UNIT, OR THEIR ENJOYMENT BY THE PUBLIC.

Criteria

- highly important or critical fish or wildlife habitat that, if lost, would constitute an important loss
- endangered species critical habitat when adequate mitigation to prevent displacement or otherwise protect listed species is not practicable
- resources having highly scenic values that, if altered, diminished, or impaired, would constitute an important loss
- cultural resources of significance and unusual character or quality when mining and related disturbance cannot be mitigated in an acceptable manner
- geological features of rare, unusual, or exemplary quality that, if altered, diminished, or impaired, would constitute an important loss

Claims

Claims identified according to the above criteria will generally be ranked for acquisition according to the following priorities:

- Loss or diminishment of resource values would be greatest.
- Loss or diminishment of resource values would not be as severe.
- Loss or diminishment of resource values would be least severe.

APPENDIX 9
Mining Claim Acquisition Criteria for Strengthened Claim Acquisition Program for Alternative C

UPON MAKING A DETERMINATION THAT MINING AND MINING-RELATED ACTIVITY WOULD NOT THREATEN OR ADVERSELY AFFECT PARK RESOURCES BASED ON THE CRITERIA IN A.1 - A.5, THE FOLLOWING CRITERIA WOULD BE APPLIED TO DETERMINE THE COMPATIBILITY OF EXISTING OR POTENTIAL NONMINING LAND USES WITH PARK MANAGEMENT, VISITOR USE, OR RESOURCE PROTECTION.

Primary Criteria

- where existing nonmining uses are not consistent or compatible with the general management plan for the unit
- where the lands are undeveloped and undisturbed or essentially undeveloped and undisturbed and where development for nonmining uses would not be consistent or compatible with the general management plan for the unit
- where the lands are already developed or disturbed for nonmining uses and subject to further development for nonmining uses where such additional development would not be consistent or compatible with the general management plan for the unit
- where the lands are subject to development that would adversely affect existing means of access or where the impacts of increased access would adversely affect park resources or visitor use
- where the lands are subject to development that would require new surface access disturbance which would adversely affect park resources
- where the lands are undeveloped and undisturbed or essentially undeveloped and undisturbed, and located in a highly visible area or in the midst of an extensive undeveloped area where development for nonmining uses or new surface access would create a highly visible intrusion or infringe into an undeveloped area

Secondary Criteria

- claims or claim groups are situated the greatest distance upstream in a stream drainage or watershed
- claims or claim groups are situated in areas important for sustaining high-quality opportunitities for recreational activities

Claims identified according to the above primary and secondary criteria will generally be ranked for acquisition according to the following priorities

- the greatest protection of park resources and enhancement of visitor enjoyment will be achieved
- less protection of park resources and enhancement of visitor enjoyment will be achieved
- the least protection of park resources and enhancement of visitor enjoyment will be achieved

APPENDIX 10. NATIONAL PARK SERVICE MINERAL MANAGEMENT PROGRAM ACTIVITIES, ALASKA REGION

The Minerals Management Division, Alaska Regional Office, has responsibility for providing policy, technical, and programmatic oversight and expertise on all matters involving minerals management issues on lands administered by the National Park Service in Alaska. In addition, minerals management staff in Denali National Park/Preserve and Wrangell-St. Elias National Park/Preserve provide in-park expertise and consultation to operators and claimants on the above in implementing park-specific minerals management responsibilities. A summary of some of the major mining related program activities follows

REVIEW AND ANALYSIS OF MINING PLANS OF OPERATIONS

National Park Service performs a cursory review of all proposed plans of operations to determine whether they contain all of the information required by regulation. Each plan must contain sufficient data so the National Park Service can determine the effects of mining on the resources of the affected park unit. Insufficient plans are returned to the claimant/operator for completion and resubmittal. If the plan of operations presents sufficient and accurate information on all aspects of the proposed mining operation, detailed engineering and environmental analyses are performed. Compliance with the National Environmental Policy Act and other applicable statutes is also achieved. If the plan of operations is approved, all permits and other regulatory requirements must be satisfied and a performance bond of sufficient amount to cover estimated reclamation and equipment and debris removal costs, etc. must be posted with the NPS prior to commencing mining activity.

EVALUATION OF ENVIRONMENTAL IMPACTS OF PLANS OF OPERATIONS AND MINERAL-RELATED PROPOSALS

As required by the National Environmental Policy Act (PL 91-190), the National Park Service evaluates the environmental impacts of any mining plan of operations that the National Park Service determines has sufficient detailed information. An environmental assessment evaluates pertinent information presented in the mining plan, including the operator's reclamation plan, the impacts of the proposed operations on park resources, and the impacts of other reasonable alternatives. National Park Service also prepares environmental assessments for actions such as NPS mineral examinations associated with mining claim validity determinations, implementation of NPS reclamation projects, and other mining related proposals, as appropriate.

MONITORING ACTIVE MINING OPERATIONS

On-site compliance monitoring of approved mining operations is conducted to ensure that activity precedes according to the terms and conditions specified in an approved plan of operations. Monitoring is also conducted to identify any necessary revisions to the plan of operations that are required to provide an adequate level of resource protection. Operations are monitored regularly during the operating season to ensure that the conditions of an approved plan of operations are met and maintained. Operations are also monitored to assess the success of reclamation practices.

APPENDIX 10
National Park Service Mineral Management Program Activities, Alaska Region

COLLECTION OF RESOURCE INFORMATION ON MINING CLAIMS, ACCESS ROUTES, AND OTHER SITES OF MINING ACTIVITY

The National Park Service gathers natural and cultural resources information to verify data required to prepare environmental compliance documents, adequately assess the effects of proposed mining operations on park resources, and determine reclamation requirements. Examples of these activities include vegetation surveys and mapping, water resource baseline assessments, wildlife and endangered species investigations, disturbed area evaluations, cultural resources surveys, and abandoned mineral site evaluations.

COORDINATE, REVIEW, AND COMMENT ON OTHER AGENCY OR PRIVATE MINERAL-RELATED PROPOSALS

The National Park Service maintains contact with other state and federal government agencies and other sources to identify proposals that have the potential for affecting park resources. These contacts are made to identify issues of possible concern to NPS, and to seek ways to mitigate potential impacts to park resources. NPS also reviews environmental documents of other agencies for proposals which may affect park resources. Examples of such proposals include scientific mineral studies, mine development and mineral extraction, mineral leasing and mining claim location on adjacent lands, proposed mineral-related regulations, and land use policies.

DEVELOP MINERAL MANAGEMENT POLICIES, REGULATIONS, AND IMPLEMENTATION GUIDELINES

The Alaska regional office participates with the Washington office, Mining and Minerals Branch to develop policies, mineral management regulations and revisions, and guidelines for mineral-related policy implementation.

RECLAMATION PROGRAM

The National Park Service evaluates the reclamation plan component of mining plans of operations and reclaims previously disturbed mine sites which come under the ownership of the United States. Program activities include reclamation feasibility studies, site restoration feasibility studies, monitoring reclamation success, and determining required bond amounts for mining operations.

MINERAL EXAMINATION AND MINING CLAIM VALIDITY DETERMINATION PROGRAM

The program for validity determinations includes conducting mineral examinations and preparing mineral reports on unpatented mining claims, providing expert witness testimony at claim contest hearings, and maintaining a current mining and minerals claim location and claimant database.

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APPENDIX 11. ANILCA, SECTION 810, SUBSISTENCE EVALUATION

INTRODUCTION

In compliance with title VIII, section 810 of the Alaska National Interest Lands Conservation Act of 1980 (ANILCA), this portion of the environmental impact statement evaluates any restrictions to subsistence activities that could possibly result from the proposed or alternative actions concerning resumed mining within Yukon-Charley Rivers National Preserve, Alaska. Section 810(a) of ANILCA states as follows.

> In determining whether to withdraw, reserve, lease, or otherwise permit the use, occupancy, or disposition of public lands under any provision of law authorizing such actions, the head of the federal agency having primary jurisdiction over such lands or his designee shall evaluate the effect of such use, occupancy, or disposition on subsistence uses and needs, the availability of other lands for the purposes sought to be achieved, and other alternatives which would reduce or eliminate the use, occupancy, or disposition of public lands needed for subsistence purposes. No such withdrawal, reservation, lease, permit, or other use, occupancy or disposition of such lands which would significantly restrict subsistence uses shall be effected until the head of such federal agency:
>
> (1) gives notice to the appropriate state agency and the appropriate local committees and regional councils established pursuant to section 805;
>
> (2) gives notice of, and holds, a hearing in the vicinity of the area involved; and
>
> (3) determines that (A) such a significant restriction of subsistence uses is necessary, consistent with sound management principles for the utilization of the public lands; (B) the proposed activity will involve the minimal amount of public lands necessary to accomplish the purposes of such use, occupancy, or other disposition, and (C) reasonable steps will be taken to minimize adverse impacts upon subsistence uses and resources resulting from such actions.

THE EVALUATION PROCESS

The status of subsistence-resource populations and habitats; access to fish, plant, and wildlife resources; and competition from resource users other than those engaged in subsistence are the three criteria that must be employed to analyze any potential restrictions on subsistence use. These criteria are to be applied in light of the purposes for which Yukon-Charley Rivers National Preserve is managed as established by ANILCA pursuant to section 201(10):

> The preserve shall be managed for the following purposes, among others. To maintain the environmental integrity of the entire Charley River basin, including streams, lakes and other natural features, in its undeveloped natural condition for public benefit and scientific study; to protect habitat for, and populations of, fish and wildlife, including but not limited to the peregrine falcons and other raptorial birds, caribou, moose, Dall sheep, grizzly bears, and wolves; and in a manner consistent with the foregoing, to protect and interpret historical sites and events associated with the gold rush on the Yukon River and the geological and paleontological history and cultural prehistory of the area.

Subsistence uses by local rural residents are to be allowed in national preserves and where specifically permitted by ANILCA in national parks and monuments (sections 201, 202, 203, and 816). Subsistence uses within Yukon-Charley Rivers National Preserve are to be permitted in accordance with titles II and VIII of ANILCA.

APPENDIX 11
ANILCA, Section 810, Subsistence Evaluation

THE PROPOSED ACTION

The preferred alternative or proposed action is alternative B. The four alternatives are described here and analyzed below according to the three subsistence criteria above in a combined evaluation with emphasis on the proposed action.

Alternative A--Review and Analyze Mining Proposals under the Regulations of 36 Code of Federal Regulations, Part 9, Subpart A, Using a Qualitative Approach to Cumulative-effects Analysis and Resource Protection Goals

Under alternative A, all patented and valid unpatented claims identified under the mining laws of the United States would be subject to the regulatory requirements of 36 Code of Federal Regulations (CFR) 9A as well as the access provisions of 43 CFR 36 and other federal and state permitting requirements.

In addition to analyzing the impacts of resumed mining under the site-specific plan of operations, which is required, the National Park Service would also qualitatively analyze the cumulative effects of a mining proposal. That subjective determination would involve the variables of past, ongoing, and reasonably foreseeable mining operations in the vicinity of the proposal. The proposal would be denied if the National Park Service found that the proposed operations would adversely affect the vicinity or would constitute a nuisance and if the negative impacts could not be mitigated. In other words, a plan of operations would be denied if it would significantly injure or adversely affect federally owned lands--both on the claim and off of the claim--and if such effects could not be sufficiently mitigated.

Alternative B--Review and Analyze Mining Proposals under the Regulations of 36 Code of Federal Regulations, Part 9, Subpart A, Using a Quantitative Approach to Cumulative-effects Analysis and Resource Protection Goals

Under alternative B, the permitting requirements delineated in alternative A would apply except that portions of the qualitative cumulative analysis conducted for each category of claims would be replaced by a quantitative method of analysis.

Briefly, the quantitative methodology includes four steps: (1) the identification of target resources with measurable/quantifiable impacts from the scoping process and the analysis of environmental consequences; (2) the estimation of a particular resource in terms of the degree it retains pristine conditions; (3) the establishment of a resource protection goal for a target resource, based upon the best professional judgment of experts in that particular field; (4) the quantification of the difference between existing conditions and the resource protection goal and the comparison of existing conditions with estimated pristine conditions to determine whether past mining has or has not reduced the resource below the resource protection goal.

Alternative C--Review and Analyze Mining Proposals under the Regulations of 36 Code of Federal Regulations, Part 9, Subpart A, Using a Quantitative Approach to Cumulative-effects Analysis and Resource Protection Goals with the Addition of Patent Restrictions for Future Patents and a Strengthened Mining Claim Acquisition Program

Alternative C is similar to alternative B with the exceptions that future patents would be issued for minerals only on claims in the park/preserve and that reclamation requirements would be held to the standards of 36 CFR 9.11 (a) (2), which requires restoration to "natural conditions" and includes provisions for "the safe movement of native wildlife, the reestablishment of native vegetative communities, the normal flow of surface and reasonable flow of subsurface waters, the return of the area to a condition which does not jeopardize visitor safety or public use of the unit, and return of the area to a condition equivalent to its pristine beauty." A strengthened mining claim acquisition program would also be implemented to acquire certain mining claims.

Alternative D--Acquisition of All Claims

Alternative D would require the National Park Service to acquire all patented and valid unpatented mining claims in the park/preserve. The service would develop a claim acquisition plan and undertake validity determinations for all unpatented claims not already examined.

Explanation and Comparison of Alternatives

The quantitative resource protection goal of alternatives B and C is defined in each case as the point where cumulative effects would "adversely affect" or "significantly injure" a resource under 36 CFR 9.10 (a) (1), (2), or (3). Cumulative effects would be calculated on an additive basis as plans of operation are submitted. That is, the environmental effects of each plan would be added in the order received to those of previous plans; a new plan would be reviewed against the accumulated effects of all plans previously received.

For alternative C to come into being, Congress would have to pass an act granting the National Park Service the authority to limit mining-claim patents. Appropriated funds would also be necessary to implement the strengthened mining claim acquisition program. In the case of alternative D, the National Park Service would have to have the necessary appropriations from Congress to implement acquisition.

In summary, alternative A assumes that the maximum amount of mining possible would occur. Alternative B assumes that less than the maximum amount would occur. That is, the determination of the cumulative effects on fish and wildlife habitats of past and projected, future mining operations would result in something less than the maximum, "full-blown" amount of mining possible that would occur in alternative A. Alternative C assumes that reasonable but restricted uses of land surfaces and fewer areas of use would occur for mining purposes, which in general would mean a further protection of wildlife habitats. Future mineral patents would limit the use of surface resources to necessary mining pursuits, and present patents would be acquired in terms of the surface estate. Thus, surface developments would be significantly limited under alternative C, and restoration would be held to the standard of natural conditions. Alternative D assumes that no mining would occur; the National Park Service would acquire all patented and valid unpatented mining claims. No future mining would mean no or little change from the existing conditions of no mining at present and thus no impacts to subsistence users under alternative D. However, this analysis examines the impacts on subsistence use that emanate from alternative C, the proposed action, and finds, as developed below following the description of the affected environment, that resumed mining with the above mitigation would be a temporary, highly localized, and relatively mild disruption as far as subsistence use is concerned.

AFFECTED ENVIRONMENT

For the convenience of the reader, the affected-environment section of the environmental impact statement is repeated here. Subsistence uses by local rural residents are to be allowed in national preserves by Title II of the Alaska National Interest Lands Conservation Act of 1980 (ANILCA, section 203). The National Park Service estimates the number of persons using subsistence resources in the preserve to be about 100 (National Park Service 1986). These 100 individuals out of a regional population of over 300 eligible persons regularly use the resources of the preserve for various types of subsistence activities.

The overall pattern of subsistence-resources use in the region of Yukon-Charley Rivers National Preserve is given below. The area of major subsistence use in relation to the preserve extends along the Charley, Yukon, Kandik, and Nation rivers. Along the Yukon, the residents of Circle (population 94), Eagle (population 194), and Eagle Village (population 79) practice subsistence activities in the preserve, as well as about 25 people who actually live within the boundaries of the preserve. Approximately 20 families or about 100 people out of a regional population of 367 regularly use the resources of the preserve for subsistence purposes (National Park Service 1986; Alaska Department of Labor 1987).

The Yukon-Charley subsistence region that we use for analysis does not include the entire harvests of the communities involved. The Yukon-Charley subsistence region for the table of estimated subsistence harvests below is not the entire region used by the people of the communities of Circle, Eagle, and Eagle Village or by other eligible subsistence users. We assume that each village has a loosely defined sphere of resources use that includes, but is not limited to, the preserve. Nevertheless, the National Park Service recognizes that Yukon-Charley National Preserve may be especially important to certain communities and households in the area for subsistence purposes. Thus, the estimates of subsistence harvests in the table below have been modified to cover a lesser region along the Yukon corridor from Eagle village downriver to Circle. The subsistence region was reduced for purposes of analysis to focus upon those areas more in proximity to Yukon-Charley Rivers National Preserve. In general, the National Park Service estimates that subsistence takes within the preserve constitute something like 25 to 30 percent of the Yukon-Charley reduced regional subsistence pattern selected for analysis for certain species.

The harvest figures below represent very rough estimates extrapolated from a variety of sources, listed in the bibliography, for a so-called typical year. The sources include technical reports of the Alaska Department of Fish and Game and preserve staff. The methodology consists of averaging any total annual harvest figures per species that may be reasonably attributed to the local residents of the villages named above. Harvest figures, available for a larger or smaller area than the subsistence region defined by these villages, were adjusted by appropriate percentages. By edible weight for purposes of species comparison, the regional subsistence pattern of Circle, Eagle, and Eagle Village including the preserve is characterized by the proportions indicated in the table below under the "Percentage" column. These percentages are based upon total edible weights per species and the conversion factors in technical paper number 107 of the Alaska Department of Fish and Game, Division of Subsistence, listed in the bibliography.

The mining study areas are along Ben and Sam creeks as well as Coal, Fourth of July, and Woodchopper creeks. Ben, Coal, and Woodchopper creeks comprise one study area, and Fourth of July Creek the other. A limited amount of subsistence trapping may occur along these drainages. However, the major locally important subsistence species are fish and moose as reflected in the estimated harvest figures that follow. Both of these are harvested mainly along the Yukon River and its major tributaries as mentioned above.

Estimated Subsistence Harvests, Yukon-Charley Rivers National Preserve, Alaska

Subsistence Resource	Regional Harvest	Estimated Percent of Total Edible Weight	Park/Preserve Portion of Regional Harvest
Bears			
black	17 animals	2	5 animals
brown/grizzly	39 animals	4	10 animals
Caribou	29 animals	3	8 animals
Dall sheep	15 animals	1	3 animals
Moose	40 animals	13	11 animals
Fish	9,708 fish	70	2,621 fish
Furbearers	1,704 animals	4	460 animals
Berries/other plants	883 pounds	1	239 pounds
Small game	726 animals	1	196 animals
Waterfowl	300 animals	1	170 animals
Firewood	311 cords		84 cords
House logs	313 logs		85 logs

In addition to black and brown/grizzly bears, the list of subsistence species above includes several varieties of berries from blueberries to salmonberries. "Fish" includes chum and king salmon, grayling, longnose sucker, northern pike, and sheefish. "Firewood" refers to cutting birch and white spruce for home heating. The category of "furbearers" is comprised of beaver, coyote, ermine, lynx, marten, mink, muskrat, red fox, red squirrel, river otter. wolf, and wolverine. "House logs" are mostly white spruce. "Plants" consist of rose hips and other edible plants not included in the "berry" category. "Small game" includes gallinaceous birds such as ptarmigan and ruffed and spruce grouse as well as porcupine and snowshoe hare.

A subsistence harvest in any given year may vary considerably from previous years because of such factors as weather, migration patterns, and natural population cycles. However, the regional pattern is assumed to be generally applicable to subsistence harvests in recent times.

SUBSISTENCE USES AND NEEDS EVALUATION

Status of Subsistence Habitats and Populations

Assumptions. Subsistence harvests in any given year may vary considerably from those of previous years because of such factors as weather, migration patterns, and natural population cycles. This analysis of possible subsistence restrictions assumes that subsistence-use areas change over time because of these natural fluctuation cycles in habitat productivity and in animal migration and population cycles. The analysis also assumes that some restrictions on subsistence access may only be temporary when considered in light of such long-term cycles.

Within the mining study areas--which are along Ben and Sam creeks as well as Coal, Fourth of July, and Woodchopper creeks--mining operations disturb subsistence resources in the immediate areas of operation (National Park Service 1988b). However, the mining locations are not in areas of primary use for the important subsistence species of fish and moose. Both of these are taken mostly along the Yukon and two of its major tributaries, the Kandik and Nation rivers.

Chum and king salmon are major subsistence resources, but the mining creeks in the study areas are not salmon spawning grounds (National Park Service 1988a). Arctic grayling, another subsistence fish species, have been affected by past mining and would be affected by resumed mining. Mining affects the water quality, sediment loading, and channel morphology of the creeks and thereby reduces the grayling population (discussed in the impacts-on-fish section). However, because grayling play only a small part in the regional subsistence pattern, reduced populations would not affect subsistence users greatly.

Mining over the short term destroys moose habitat. Although the long-term effects of mining on moose habitat are not fully understood, this analysis assumes that mining disturbs and displaces moose. This is a topic discussed in the impacts-on-wildlife and impacts-on-vegetation sections of the environmental impact statement.

Boats are most often used by subsistence hunters when hunting moose. Moose frequent the mining creeks as they do many other riverine environments in the Yukon-Charley area. Yet, these creeks are not major spots to seek moose. There are many accessible areas by boat along the Yukon, Kandik, and Nation rivers that the local residents recognize as good moose habitats.

A limited amount of subsistence trapping of furbearers is known to take place along some of the mining drainages. Resumed mining would disturb and displace furbearers the way it would moose. However, furbearers as a category constitutes only about four percent by weight of the overall subsistence pattern as does the category of brown bear with caribou at three percent and black bear at two percent.

Both bear species are wide ranging, and the highly localized mining disturbances would hardly matter in terms of subsistence hunting for bears. The human activities and stored food associated with mining would probably lead to increased bear/people contacts, often to the detriment of the bears. That is, a few bears may be shot and killed in defense of life and property that would not be otherwise. This subject is discussed in the impacts on wildlife section.

The Coal Creek area is within a former spring and fall migration route of the Fortymile caribou herd. Because caribou would simply avoid by a few hundred yards any sites occupied by humans and because the route has changed with this herd no longer migrating through the area, no impacts on the subsistence use of caribou are anticipated from resumed mining. Only limited mining, in a small tributary, is foreseen in the Coal Creek drainage.

Resumed mining would destroy some grayling, moose, and furbearer habitats and could possibly lead to a slight reduction in the number of black and brown bears in the area, but from a holistic point of view, no measurable impacts are foreseen on the subsistence uses of resources. The overall regional subsistence pattern would not be affected because little subsistence use occurs along the mining drainages. Any population reductions in subsistence fish and wildlife species would not be of a magnitude to affect the subsistence take of any single species.

Access

With resumed mining along Ben and Sam creeks and Coal, Fourth of July, and Woodchopper creeks, the few subsistence users who actually fish, hunt, or trap in these study areas may wish to alter some of their subsistence practices by persuing other drainages and by relocating their trapping lines. Individual hunters and trappers could be forced to go farther or elsewhere for quarry because of wildlife displacement. Such changes would constitute a slight restriction in subsistence access but not a hardship.

Potential to Increase Competition

Competition for subsistence resources by miners could increase but presumably not by much under alternatives A, B, and C. If 2 to 12 persons would be added per mining operation and if four operations are anticipated, there could be an increase of as many as 48 miners per year to the pressures on the resources of Yukon-Charley Rivers National Preserve. However, it is improbable that more than a fraction of these would ever become direct competitors for subsistence resources. Local residency is the requirement under state and federal regulations so miners may not qualify for subsistence use. Also, miners today routinely bring in food and supplies and do not "live off the land" to the extent that they did at the turn of the century and in subsequent years. Over the long term, resumed mining would add only a small amount of pressure on subsistence resources and not measurably affect the regional subsistence pattern in relation to the preserve.

In the preserve, miners could compete with subsistence users as sport hunters and fishermen. However, the open seasons for moose--subsistence and sport--overlap even if they do not coincide exactly and usually begin in the late summer or early fall. Mining can proceed until freeze-up, and thus be well within the hunting seasons. However, the point is that mining occurs mainly during the summer months. And hunting and trapping occur mostly during the other months of the year, thereby reducing the potential of competition for subsistence resources.

Over the long term, resumed mining would add only a small amount of pressure on subsistence resources and not measurably affect the regional subsistence pattern in relation to the preserve under alternatives A, B, and C. Alternative D means no new mining, and thus no impact.

AVAILABILITY OF OTHER LANDS/REDUCTION IN USE OF PUBLIC LANDS - ALL ALTERNATIVES

No other lands are available for resumed mining consideration because the claims in question were declared prior to the closure to mineral entry of the preserve by ANILCA. Congress passed the Mining in the Parks Act in 1976 (PL 94-429), which took that action, and in 1980 established the preserve through ANILCA.

APPENDIX 11
ANILCA, Section 810, Subsistence Evaluation

A reduction or elimination of public lands (unpatented mining claims) used for mining because of the effects on subsistence does not appear to be a feasible nor desirable alternative given the anticipated mining scenario for the park. No significant impact on subsistence uses is expected under any of the alternatives. Any acquisition of patented (private) or unpatented (public lands) mining claims would reduce mining activities and any impacts on subsistence uses. Alternatives C and D could be beneficial to subsistence practices.

OTHER ALTERNATIVES

This evaluation has described and analyzed the four alternatives of the environmental impact statement with emphasis on the proposed action. Other alternatives were considered but eliminated from further analysis during the scoping process. The reader is referred to that section in the document for a discussion of the range of alternatives considered, from taking no action to removing mining areas from park/preserve lands. These alternatives were eliminated from further study because of reasons of impracticality and infeasibility.

CONSULTATION AND COORDINATION

The Alaska Department of Fish and Game, other affected governmental agencies, local rural residents, native and professional organizations including the Alaska Miners Association, and the general public were consulted in preparing the alternatives. For a detailed list, please see the section on "Consultation and Coordination" in the environmental impact statement.

FINDINGS

The National Park Service concludes from this evaluation that three alternatives (A, B, and C) to resume mining at progressively different levels of operation--from greatest to least amount--and one alternative (D) to provide for no new mining at all by buying out the claims would not significantly restrict subsistence resource users in any case. In the two mining study areas--Ben, Coal, Sam and Woodchopper creeks and Fourth of July Creek--some slight access restrictions could affect a few subsistence users but would not cause overall, significant impacts on the subsistence uses of resources. The pattern of subsistence-resources use within Yukon-Charley Rivers National Preserve, Alaska, would continue under alternatives A, B, and C with not much change from existing conditions and with no change under alternative D from existing conditions.

This evaluation demonstrates that no significant restriction of subsistence uses is reasonably foreseeable from the proposed action or other alternatives.

APPENDIX 12. EXECUTIVE ORDER 11990 - PROTECTION OF WETLANDS

Executive Order 11990 directs each federal agency to "provide leadership and . . . take action to minimize the destruction, loss or degradation of wetlands" (42 FR 26951, May 25, 1977). The National Park Service has developed agency guidance for compliance with this executive order.

According to EPA (40 CFR 230.3 (t)) and ACOE (33 CFR 328.3 (f)) wetlands are defined as "those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions". Placer mining and some load mining are functionally dependent on activity conducted in wetlands in and adjacent to streams.

The location of mining is determined by and confined to areas within mining claim boundaries. Since the claim boundaries are permanently established, the flexibility for alternative locations for operations to occur are extremely limited. The National Park Service, in reviewing and approving placer and lode mining operations in Alaska national park units according to 36 CFR Subpart 9A (Minerals Management in National Park Service units), finds that there is no practiceable alternative to most placer operations and some lode operations disturbing wetland areas.

Plans of operations must include all measures to minimize adverse effects on wetlands in order to avoid to the extent possible the long and short term adverse impacts associated with the destruction or modification of wetlands.

Wetland mitigative measures will be part of approved plans of operation and will be carried out throughout the life of the operation in addition to specific post-mining reclamation as required in 36 CFR Subpart 9A.

Public review of potential wetland disturbance and required reclamation efforts will be made available for public review through the environmental assessment of the plans of operation, under the guidance of the National Environmental Policy Act (NEPA; 40 CFR 1500[PL 91-190]).

APPENDIX 13. EXECUTIVE ORDER 11988 - FLOODPLAIN MANAGEMENT

Executive Order 11988 directs each federal agency to "provide leadership and . . . take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health and welfare and to restore and preserve the natural and beneficicial values served by floodplains . . .". It also directs federal agencies "to evaluate the potential effects of any actions it may take in a floodplain" (42 FR 26951, May 25, 1977). The National Park Service has developed agency guidance for compliance with this executive order.

Placer mining and some lode mining are functionally dependent upon water, and most of these activities cannot be conducted at sites outside the floodplain. The National Park Service, in reviewing and permitting placer and lode mining operations in Alaska park units, finds the necessity of many of the actions to occur in the floodplain and shall permit actions so that potential harm to or within the floodplain would be minimal.

Mitigation of such effects would include placing structures and housing units outside the 100-year floodplain and constructing settling ponds and raceways at a maximum distance from the active stream channel. Fuels and other hazardous materials would be stored the maximum practicable distance out of the floodplain and Spill Prevention Countermeasure and Control Programs would be required according to 40 CFR 112. Cultural resources would be protected from disturbance in accordance with the National Historic Preservation Act of 1966 (PL 86-665).

Post-mining reclamation measures within the floodplain would include removal of structures and restoration of floodplain topography. Floodplain reclamation efforts would conform with state and local floodplain standards. Public review will be provided through the site-specific environmental assessment process on any mining plans of operation.

APPENDIX 14. WATER RESOURCE PROTECTION MEASURES AND OPERATING STIPULATIONS FOR APPROVED MINING PLANS OF OPERATIONS

The claimant/operator must comply with all applicable National Park Service, other federal, state and local laws and regulations applicable to mining, water quality, air quality, water use, solid waste disposal, licensing, general park use and other related matters.

WATER RESOURCE PROTECTION MEASURES

1. **Effluent Limitation Guidelines** promulgated by the Environmental Protection Agency (EPA) for the Ore Mining and Dressing Point Source Categories (including placer mining) were final on May 24, 1988. The National Park Service will adopt, at a minimum, these new guidelines in approving or disapproving mining plans of operations under its Mineral Management Regulations for Mining and Mining Claims at 36 CFR Subpart 9A. Significant points of the new Effluent Limitation Guidelines are summarized below.

   - The Best Available Technology (BAT) for applicable placer operations is **recirculation** of all process wastewater. Implementation of recirculation, as described by EPA, allows for discharge of process waters when excess make-up water is not used for gold recovery. This discharge must meet state and federal water quality standards. At a minimum, operations in NPS units will be required to implement BAT.

     Total recycle of wastewaters (i.e., no process water or excess water discharge) may be required of certain operators in order to adequately protect national park resources.

   - The EPA rule applies to all open-cut operations processing greater than 1,500 cubic yards ore/year (cy/yr). Operations in NPS units that process less than 1,500 cy/yr, will also be required to employ BAT recirculation or total recycle, if necessary, to adequately protect park resources.

   - Waste treatment facilities for mining operations in NPS units will be constructed to at **least** be able to contain and treat the maximum volume of wastewater resulting from processing ore during a four-hour period plus the volume that would be discharged from a five-year, six-hour precipitation event as described in the new EPA effluent guidelines. Wastewater discharge, as a result of storm event volumes greater than the designated facility size, would be exempt from compliance actions.

   - Tundra filtering, filter drains, and chemically assisted settling are not considered BAT for operations in NPS units.

2. **National Pollution Discharge Elimination System (NPDES) permits**, as required by section 402 of the Clean Water Act (PL 92-500), must be obtained by an operator prior to approval of a mining plan of operation. Federal effluent guidelines (.2 ml/l settleable solids) and state of Alaska water quality standards for the designated use of drinking water (5 NTU standard for turbidity) at a minimum will be adopted into NPDES permits for mining operations in national park units.

3. Waters in national park units constitute an outstanding national resource and shall be maintained and protected according to the EPA antidegradation policy (40 CFR 131.12). Alaska state **mixing zones and start-up variances,** and EPA **dilution variances** will not be accepted in plans of operations in Alaska National Park units unless the National Park Service has determined, prior to the issuance of the NPDES permit, that no significant impacts will occur from the proposed action. The NPS will work with the Alaska Department of Environmental Conservation (ADEC) and EPA to ensure that proposed variances are carefully reviewed before incorporation into NPDES permits.

4. **Groundwater from drilling operations** will be required to have appropriate treatment and disposal methods to minimize impacts to wetlands and surface water.

5. **Best Management Practices (BMP)** to control nonpoint runoff from mining operations will be stipulated prior to approval of plans of operations in NPS units. Implementation of BMP, however, will not totally eliminate nonpoint runoff from operations due to design limitations and major storm events.

6. Dredge and fill permits, required by **section 404 of the Clean Water Act** and administered by Army Corps of Engineers (COE) and EPA, must be obtained by an operator, when applicable, prior to approval of a mining plan of operation in an NPS unit. Section 10 of the **Rivers and Harbors Act of 1899** does not apply to any waters evaluated in the EIS and therefore no permits will be required.

7. **Executive Order #11990, Protection of Wetlands and Executive Order #11988, Floodplain Management,** will be addressed in each environmental assessment of a plan of operations and wetland and floodplain mitigation measures will be incorporated into the approval of a plan.

8. **Permits from Alaska Department of Fish and Game** (ADFG) must be obtained prior to NPS approval of any mining activity in waters important to anadromous fish as required by Alaska Statute 16.05.870 and defined in the "Alaska Atlas and Catalog for Spawning, Rearing or Migration of Anadromous Fishes". Also, ADFG Habitat Protection permits must be obtained, as required by Alaska Statute 16.05.840, to protect resident fish.

9. A **Spill Prevention, Control and Counter Measures Plan** (SPCC) (40 CFR 112) must be prepared and followed for any facility with an unburied fuel storage unit with a capacity greater than 1,320 gallons, or a buried storage tank with a capacity of greater than 42,000 gallons.

10. **Alaska wastewater disposal regulations** (18 AAC 72.021) will be implemented at all mining operations. These regulations require a 100 foot setback from surface waters and a four foot separation distance above groundwater for the disposal of human waste. Similarly, wastewater from mining camp kitchens or other facilities shall be discharged so that surface and groundwater in the vicinity are not impaired.

12. Active mining **operations will be monitored** and water quality will be documented on a regular basis by the National Park Service as part of its mineral management program. Any necessary water quality enforcement actions will be conducted in conjunction with EPA and ADEC.

ACCESS REQUIREMENTS

1. In Alaska park units only, access to mining claims is governed by the Department of the Interior transportation and utility system regulations for Alaska (43 CFR Part 36). These regulations implement section 1110(b) of ANILCA which guarantees adequate and feasible access to valid inholdings. Section 36.10 of the access regulations specify procedures for access across park lands to valid inholdings, including patented and valid unpatented mining claims. A right of way permit for access is required when an adequate and feasible access route does not otherwise exist.

   The National Park Service will specify alternate, adequate and feasible routes or methods that are economically practicable, but not necessarily the least costly if a right of way permit is required and if the requested route or methods

   - would cause significant adverse impacts on natural resources or other values
   - would jeopardize public health and safety
   - is not consistent with the unit's approved planning documents or purpose for addition to the national park system
   - are not necessary to accomplish the individual's land use objective

2. The National Park Service will generally not approve a right of way application for a new route to support a mining operation if there is an existing route that will meet approval standards in the plan of operations or plan supplementation.

3. Existing access routes to claims must be used when available and suitable and approved in the plan of operations or plan supplementation.

4. Vehicle movement will be confined to routes or trails approved in the plan of operations or a separate access permit in a manner that will cause minimal disturbance.

5. Any new surface access route to or on claims requiring new surface disturbance must be approved by the park superintendent and thoroughly described in the approved plan of operations.

6. Access routes must be designated and may be marked in the field by National Park Service in coordination with the claimant/operator. Proposed new routes will be examined by the National Park Service and approved activites will be monitored and modified as necessary to avoid or minimize impacts to any natural or cultural resources.

7. Access to mining claims using heavy mining equipment may be limited by seasonal restrictions to adequately protect park resources.

MINE OPERATION STANDARDS

Specific operating standards are developed individually for each mining plan of operations. The standards are designed around the parameters of the proposed plan of operations and the specific resources found in the area of the operation to prevent or minimize damage to park resources. The following operating standards are examples of the types of stipulations that may be applied to mining operations in park units in Alaska:

1. Mining camps and all supporting facilities must be located within claim boundaries.

2. Garbage and refuse disposal shall be either by removal from the park or disposed of at a site away from any stream or water body (18 AAC 60, Solid Waste Management; 11 AAC 400, 410, Burn Permits).

3. Except for access, all mining activities must be confined within the boundaries of the claim.

4. Corners of all mining claims must be properly located.

5. Removal of trees not on the claims for use in mining operations will not be authorized.

6. Topsoil and other organic matter should be stockpiled and used for reclamation purposes.

7. Any amalgamates used in the mining operation, must be properly contained and not allowed to escape into natural water or gravels.

RECLAMATION REQUIREMENTS

The following are requirements of the NPS Mining and Minerals Management regulations found at 36 CFR 9A.

1. **Mining reclamation** will occur according to regulations at 36 CFR Subpart 9A, Section 9.11 and should be accomplished contemporaneously with mining and in no case later than six months after completion of operations.

2. For claims patented with surface-use restrictions or unpatented claims, the minimum reclamation requirements (Sec. 9.11 (a)(2)) include: removal of all above ground nonhistoric structures, equipment

and other manmade debris; prevention of surface subsidence; replacing overburden and spoil, wherever economically and technologically feasible; grading to reasonably conform the contour of the area of operations to a contour similar to that which existed prior to initiation of operations; replacing topsoil necessary for vegetative restoration; and reestablishing native vegetative communities.

3. Reclamation under Section 9.11 (a)(2) must provide for the safe movement of wildlife, the normal flow of surface and reasonable flow of subsurface waters, the reestablishment of vegetation, the return of the area to a condition which does not jeopardize visitor safety or public use of the unit, and return of the area to a condition equivalent to its pristine beauty (Section 9.11 (b)).

4. On claims patented without surface-use restrictions, reclamation requirements are less stringent (Sec. 9.11 (a)(1)). Requirements include removal of all above ground structures, equipment and other manmade debris used for operations and rehabilitation of the area of operations to a condition that would not adversely affect, injure or damage, federally owned lands, or to a condition that would not constitute a nuisance.

APPENDIX 15. LAWS AND REGULATIONS FOR MINING ACTIVITIES AND ACCESS TO INHOLDINGS IN ALASKA NATIONAL PARK SYSTEM UNITS

LAWS	NOTES	APPLICABLE REGULATIONS
Mining Law of 1872 (30 USC 21 et seq.)	Allows mining claims on public domain lands; claimants have mineral rights to unpatented claims; fee title to surface and subsurface only by patent process.	43 CFR 3800
	All NPS units now closed to mineral location. About 1,640 unpatented and patented mining claims exist in nine Alaska NPS units.	
Mining in the Parks Act of 1976 (PL 94-429)	Closed last six NPS units open to mineral location (Mount McKinley, Glacier Bay, Death Valley, Organ Pipe Cactus, Coronado, and Crater Lake).	
	Authorized secretary of the interior to regulate activity associated with unpatented and patented mining claims within all NPS units. Regulatory requirements include mining plan of operations for NPS approval, reclamation plan, and performance bond.	36 CFR 9A
Alaska National Interest Lands Conservation Act of 1980 (ANILCA) (PL 96-487)	ANILCA section 1110(b) guarantees adequate and feasible access to park inholdings subject to regulation by secretary of the interior.	
	Access regulations govern access to mining claims in Alaska NPS units. Right-of-way permit may be required specifying approved access routes and methods.	43 CFR 36

APPENDIX 15
Laws and Regulations for Mining Activities and Access to Inholdings in Alaska National Park System Units

MINING IN THE PARKS ACT OF 1976 (PL 94-429)

Public Law 94-429
94th Congress

An Act

Sept. 28, 1976
[S. 2371]

To provide for the regulation of mining activity within, and to repeal the application of mining laws to, areas of the National Park System, and for other purposes.

National Park System.
Mining activity, regulation.
16 USC 1901.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Congress finds and declares that—

(a) the level of technology of mineral exploration and development has changed radically in recent years and continued application of the mining laws of the United States to those areas of the National Park System to which it applies, conflicts with the purposes for which they were established; and

(b) all mining operations in areas of the National Park System should be conducted so as to prevent or minimize damage to the environment and other resource values, and, in certain areas of the National Park System, surface disturbance from mineral development should be temporarily halted while Congress determines whether or not to acquire any valid mineral rights which may exist in such areas.

16 USC 1902.

SEC. 2. In order to preserve for the benefit of present and future generations the pristine beauty of areas of the National Park System, and to further the purposes of the Act of August 25, 1916, as amended (16 U.S.C. 1) and the individual organic Acts for the various areas of the National Park System, all activities resulting from the exercise of valid existing mineral rights on patented or unpatented mining claims within any area of the National Park System shall be subject to such regulations prescribed by the Secretary of the Interior as he deems necessary or desirable for the preservation and management of those areas.

SEC. 3. Subject to valid existing rights, the following Acts are amended or repealed as indicated in order to close these areas to entry and location under the Mining Law of 1872:

(a) the first proviso of section 3 of the Act of May 22, 1902 (32 Stat. 203; 16 U.S.C. 123), relating to Crater Lake National Park, is amended by deleting the words "and to the location of mining claims and the working of same";

Repeals.

(b) section 4 of the Act of February 26, 1917 (39 Stat. 938; 16 U.S.C. 350), relating to Mount McKinley National Park, is hereby repealed;

(c) section 2 of the Act of January 26, 1931 (46 Stat. 1043; 16 U.S.C. 350a), relating to Mount McKinley National Park, is hereby repealed;

(d) the Act of June 13, 1933 (48 Stat. 139; 16 U.S.C. 447), relating to Death Valley National Monument, is hereby repealed;

(e) the Act of June 22, 1936 (49 Stat. 1817), relating to Glacier Bay National Monument, is hereby repealed;

(f) section 3 of the Act of August 18, 1941 (55 Stat. 631; 16 U.S.C. 450y-2), relating to Coronado National Memorial is amended by replacing the semicolon in subsection (a) with a period and deleting the prefix "(a)", the word "and" immediately preceding subsection (b), and by repealing subsection (b); and

Repeal.

(g) The Act of October 27, 1941 (55 Stat. 745; 16 U.S.C. 450z), relating to Organ Pipe Cactus National Monument, is hereby repealed.

Certain mining operations, temporary cessation.
16 USC 1903.

SEC. 4. For a period of four years after the date of enactment of this Act, holders of valid mineral rights located within the boundaries of Death Valley National Monument, Mount McKinley National Park, and Organ Pipe Cactus National Monument shall not disturb for purposes of mineral exploration or development the surface of any lands which had not been significantly disturbed for purposes of mineral extraction prior to February 29, 1976: *Provided*, That if the Secretary finds that enlargement of the existing excavation of an individual mining operation is necessary in order to make feasible continued production therefrom at an annual rate not to exceed the average annual production level of said operation for the three calendar years 1973, 1974, and 1975, the surface of lands contiguous to the existing excavation may be disturbed to the minimum extent necessary to effect such enlargement, subject to such regulations as may be issued by the Secretary under section 2 of this Act. For purposes of this section, each separate mining excavation shall be treated as an individual mining operation.

16 USC 1904.

SEC. 5. The requirements for annual expenditures on mining claims imposed by Revised Statute 2324 (30 U.S.C. 28) shall not apply to any claim subject to section 4 of this Act during the time such claim is subject to such section.

Certain unpatented mining claims, recommendations for acquisition.
16 USC 1905.

SEC. 6. Within two years after the date of enactment of this Act, the Secretary of the Interior shall determine the validity of any unpatented mining claims within Glacier Bay National Monument, Death Valley and Organ Pipe Cactus National Monuments and Mount McKinley National Park and submit to the Congress recommendations as to whether any valid or patented claims should be acquired by the United States, including the estimated acquisition costs of such claims, and a discussion of the environmental consequences of the extraction of minerals from these lands. The Secretary shall also study and within two years submit to Congress his recommendations for modifications or adjustments to the existing boundaries of the Death Valley National Monument and the Glacier Bay National Monument to exclude significant mineral deposits and to decrease possible acquisition costs.

Study.
Recommendations, submittal to Congress.

Recommendations, submittal to Congress.
16 USC 1906.

SEC. 7. Within four years after the date of enactment of this Act, the Secretary of the Interior shall determine the validity of any unpatented mining claims within Crater Lake National Park, Coronado National Memorial, and Glacier Bay National Monument, and submit to the Congress recommendations as to whether any valid or patented claims should be acquired by the United States.

Mining claims, recordation.
16 USC 1907.

SEC. 8. All mining claims under the Mining Law of 1872, as amended and supplemented (30 U.S.C. chapters 2, 12A, and 16 and sections 161 and 162) which lie within the boundaries of units of the National Park System shall be recorded with the Secretary of the Interior within one year after the effective date of this Act. Any mining claim not so recorded shall be conclusively presumed to be abandoned and shall be void. Such recordation will not render valid any claim which was not valid on the effective date of this Act, or which becomes invalid thereafter. Within thirty days following the date of enactment of this Act, the Secretary shall publish notice of the requirement for such recordation in the Federal Register. He shall also publish similar notices in newspapers of general circulation in the areas adjacent to those units of the National Park System listed in section 3 of this Act.

Publication in Federal Register.

Landmarks.
Report to Advisory Council on Historic Preservation.
16 USC 1908.

SEC. 9. (a) Whenever the Secretary of the Interior finds on his own motion or upon being notified in writing by an appropriate scientific, historical, or archeological authority, that a district, site, building, structure, or object which has been found to be nationally significant in illustrating natural history or the history of the United States and which has been designated as a natural or historical landmark may be irreparably lost or destroyed in whole or in part by any surface mining activity, including exploration for or removal or production of minerals or materials, he shall notify the person conducting such activity and submit a report thereon, including the basis for his finding that such activity may cause irreparable loss or destruction of a national landmark, to the Advisory Council on Historic Preservation, with a request for advice of the Council as to alternative measures that may be taken by the United States to mitigate or abate such activity.

Report to Congress.
Legislative recommendations.

(b) The Council shall within two years from the effective date of this section submit to the Congress a report on the actual or potential effects of surface mining activities on natural and historical landmarks and shall include with its report its recommendations for such legislation as may be necessary and appropriate to protect natural and historical landmarks from activities, including surface mining activities, which may have an adverse impact on such landmarks.

Severability.
16 USC 1909.

SEC. 10. If any provision of this Act is declared to be invalid, such declaration shall not affect the validity of any other provision hereof.

Civil actions.
16 USC 1910.

SEC. 11. The holder of any patented or unpatented mining claim subject to this Act who believes he has suffered a loss by operation of this Act, or by orders or regulations issued pursuant thereto, may bring an action in a United States district court to recover just compensation, which shall be awarded if the court finds that such loss constitutes a taking of property compensable under the Constitution. The court shall expedite its consideration of any claim brought pursuant to this section.

16 USC 1911.

SEC. 12. Nothing in this Act shall be construed to limit the authority of the Secretary to acquire lands and interests in lands within the boundaries of any unit of the National Park System. The Secretary is to give prompt and careful consideration to any offer made by the owner of any valid right or other property within the areas named in section 6 of this Act to sell such right or other property, if such owner notifies the Secretary that the continued ownership of such right or property is causing, or would result in, undue hardship.

SUNSHINE IN GOVERNMENT

Interior Department employees, financial disclosure.
16 USC 1912.

SEC. 13. (a) Each officer or employee of the Secretary of the Interior who—

(1) performs any function or duty under this Act, or any Acts amended by this Act concerning the regulation of mining within the National Park System; and

(2) has any known financial interest (A) in any person subject to such Acts, or (B) in any person who holds a mining claim within the boundaries of units of the National Park System;

shall, beginning on February 1, 1977, annually file with the Secretary a written statement concerning all such interests held by such officer or employee during the preceding calendar year. Such statement shall be available to the public.

(b) The Secretary shall—

(1) act within ninety days after the date of enactment of this Act—

(A) to define the term "known financial interest" for purposes of subsection (a) of this section; and

(B) to establish the methods by which the requirement to file written statements specified in subsection (a) of this section will be monitored and enforced, including appropriate provisions for the filing by such officers and employees of such statements and the review by the Secretary of such statements; and

(2) report to the Congress on June 1 of each calendar year with respect to such disclosures and the actions taken in regard thereto during the preceding calendar year.

Report to Congress.

(c) In the rules prescribed in subsection (b) of this section, the Secretary may identify specific positions within such agency which are of a nonregulatory or nonpolicymaking nature and provide that officers or employees occupying such positions shall be exempt from the requirements of this section.

Exemptions.

(d) Any officer or employee who is subject to, and knowingly violates, this section or any regulation issued thereunder, shall be fined not more than $2,500 or imprisoned not more than one year, or both.

Penalty.

Approved September 28, 1976.

LEGISLATIVE HISTORY:

HOUSE REPORT No. 94-1428 (Comm. on Interior and Insular Affairs).
SENATE REPORT No. 94-567 (Comm. on Interior and Insular Affairs).
CONGRESSIONAL RECORD, Vol. 122 (1976):
    Feb. 3, 4, considered and passed Senate.
    Sept. 14, considered and passed House, amended.
    Sept. 17, Senate concurred in House amendments.

NPS REGULATIONS FOR MINING AND MINING CLAIMS (36 CFR 9A)

PART 9—MINERALS MANAGEMENT

Subpart A—Mining and Mining Claims

Sec.
9.1 Purpose and scope.
9.2 Definitions.
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9.4 Surface disturbance moratorium.
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9.6 Transfers of interest.
9.7 Assessment work.
9.8 Use of water.
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9.11 Reclamation requirements.
9.12 Supplementation or revision of plan of operations.
9.13 Performance bond.
9.14 Appeals.
9.15 Use of roads by commercial vehicles.
9.16 Penalties.
9.17 Public inspection of documents.
9.18 Surface use and patent restrictions.

Subpart A—Mining and Mining Claims

AUTHORITY: Mining Law of 1872 (R.S. 2319; 30 U.S.C. 21 et seq.); Act of August 25, 1916 (39 Stat. 535, as amended (16 U.S.C. 1 et seq.); Act of September 28, 1976; 90 Stat. 1342 (16 U.S.C. 1901 et seq.)).

SOURCE: 42 FR 4835, Jan. 26, 1977, unless otherwise noted. Subpart A designated at 43 FR 57825, Dec. 8, 1978.

§ 9.1 Purpose and scope.

These regulations control all activities within units of the National Park System resulting from the exercise of valid existing mineral rights on patented or unpatented mining claims without regard to the means or route by which the operator gains access to the claim. The purpose of these regulations is to insure that such activities are conducted in a manner consistent with the purposes for which the National Park System and each unit thereof were created, to prevent or minimize damage to the environment or other resource values, and to insure that the pristine beauty of the units is preserved for the benefit of present and future generations. These regulations apply to all operations, as defined herein, conducted within the boundaries of any unit of the National Park System.

§ 9.2 Definitions.

The terms used in this part shall have the following meanings:

(a) *Secretary.* The Secretary of the Interior.

(b) *Operations.* All functions, work and activities in connection with mining on claims, including: prospecting, exploration, surveying, development and extraction; dumping mine wastes and stockpiling ore; transport or processing of mineral commodities; reclamation of the surface disturbed by such activities; and all activities and uses reasonably incident thereto, including construction or use of roads or other means of access on National Park System lands, regardless of whether such activities and uses take place on Federal, State, or private lands.

(c) *Operator.* A person conducting or proposing to conduct operations.

(d) *Person.* Any individual, partnership, corporation, association, or other entity.

(e) *Superintendent.* The Superintendent, or his designee, of the unit of the National Park System containing claims subject to these regulations.

(f) *Surface mining.* Mining in surface excavations, including placer mining, mining in open glory-holes or mining pits, mining and removing ore from open cuts, and the removal of capping or overburden to uncover ore.

(g) *The Act.* The Act of September 28, 1976, 90 Stat. 1342, 16 U.S.C. 1901 et seq.

(h) *Commercial vehicle.* Any motorized equipment used for transporting the product being mined or excavated, or for transporting heavy equipment used in mining operations.

(i) *Unit.* Any National Park System area containing a claim or claims subject to these regulations.

(j) *Claimant.* The owner, or his legal representative, of any claim lying within the boundaries of a unit.

(k) *Claim.* Any valid, patented or unpatented mining claim, mill site, or tunnel site.

(l) *Regional Director.* Regional Director for the National Park Service region in which the given unit is located.

(m) *Significantly disturbed for purposes of mineral extraction.* Land will be considered significantly disturbed for purposes of mineral extraction when there has been surface extraction of commercial amounts of a mineral, or significant amounts of overburden or spoil have been displaced due to the extraction of commercial amounts of a mineral. Extraction of commercial amounts is defined as the removal of ore from a claim in the normal course of business of extraction for processing or marketing. It does not encompass the removal of ore for purposes of testing, experimentation, examination or preproduction activities.

(n) *Designated roads.* Those existing roads determined by the Superintendent in accordance with 36 CFR 1.5 to be open for the use of the public or an operator.

(o) *Production.* Number of tons of a marketable mineral extracted from a given operation.

§ 9.3 Access permits.

(a) All special use or other permits dealing with access to and from claims within any unit are automatically revoked 120 days after January 26, 1977. All operators seeking new or continued access to and from a claim after that date must file for new access permits in accordance with these regulations, unless access to a mining claim is by pack animal or foot. (See § 9.7 for restrictions on assessment work and § 9.9(d) and § 9.10(g) for extensions of permits.)

(b) Prior to the issuance of a permit for access to any claim or claims, the operator must file with the Superintendent a plan of operations pursuant to § 9.9. No permit shall be issued until the plan of operations has been approved in accordance with § 9.10.

(c) No access to claims outside a unit will be permitted across unit lands unless such access is by foot, pack animal, or designated road. Persons using such roads for access to such claims must comply with the terms of § 9.15 where applicable.

(d) In units of the National Park System in Alaska, regulations at 43 CFR Part 36 govern access to claims, and the provisions of 36 CFR 9.3 (a), (b), and (c) are inapplicable.

§ 9.4 Surface disturbance moratorium.

(a) For a period of four years after September 28, 1976, no operator of a claim located within the boundaries of Death Valley National Monument, Mount McKinley National Park, or Organ Pipe Cactus National Monument (see also claims subject to § 9.10(a)(3)) shall disturb for purposes of mineral exploration or development the surface of any lands which had not been significantly disturbed for purposes of mineral extraction prior to February 29, 1976, except as provided in this section. However, where a claim is subject, for a peroid of four years after September 28, 1976, to this section solely by virtue of § 9.10(a)(3), the date before which there must have been significant disturbance for purposes of mineral extraction is January 26, 1977.

(b) An operator of a claim in one of these units seeking to enlarge an existing excavation or otherwise disturb the surface for purposes of mineral exploration or development shall file with the Superintendent an application stating his need to disturb additional surface in order to maintain production at an annual rate not to exceed an average annual production level of said operations for the three calendar years 1973, 1974, and 1975. Accompanying the application shall be a plan of operations which complies with § 9.9 and verified copies of production records for the years 1973, 1974, and 1975.

(c) If the Regional Director finds that the submitted plan of operations complies with § 9.9, that enlargement of the existing excavation of an individual mining operation is necessary in order to make feasible continued production therefrom at an annual rate not to exceed the average annual production level of said operation for the three calendar years 1973, 1974, and 1975, and that the plan of operations meets the applicable standard of approval of § 9.10(a)(1), he shall issue a permit allowing the disturbance of the surface of the lands contiguous to the existing excavation to the minimum extent necessary to effect such enlargement. For the purpose of this section "lands contiguous to the existing excavation" shall include land which actually adjoins the existing excavation or which could logically become an extension of the excavation; for example, drilling to determine the extent and direction to which the existing excavation should be extended may be permitted at a site which does not actually adjoin the excavating.

(d) The appropriate reclamation standard to be applied will be determined by the nature of the claim. (See §§ 9.11(a)(1) and (a)(2).)

(e) Operations conducted under a permit pursuant to this section shall be subject to all the limitations imposed by this Part.

(f) For the purposes of this section, each separate mining excavation shall be treated as an individual mining operation.

§ 9.5 Recordation.

(a) Any unpatented mining claim in a unit in existence on September 28, 1976, which was not recorded on or before September 28, 1977, in accordance with the Notice of October 20, 1976 (41 FR 46357) or 36 CFR 9.5 as promulgated on January 26, 1977, is, pursuant to section 8 of the Act, conclusively presumed to be abandoned and shall be void.

(b) Any unpatented mining claim in a unit established after September 28, 1976, or in an area added to an existing unit after that date, shall be recorded with the Bureau of Land Management in accordance with the provisions of section 314 of the Federal Land Policy and Management Act (FLPMA), 90 Stat. 2769, 43 U.S.C. 1744, and regulations implementing it (43 CFR 3833.1).

(c) A claimant of an unpatented mining claim in any unit must file annually with the Bureau of Land Management a notice of intention to hold a claim or evidence of annual assessment work required by section 314 of FLPMA, as implemented by 43 CFR 3833.2. A copy of each such filing will be provided to the Superintendent of the appropriate unit by the Bureau of Land Management.

(d) The effect of failure to file the instruments required by paragraphs (b) and (c) of this section shall be controlled by 43 CFR 3833.4. Recordation or filing under this section shall not render any claim valid which would not otherwise be valid under applicable law and shall not give the claimant any rights to which he is not otherwise entitled by law.

(Act of September 28, 1976 (16 U.S.C. 1901 *et seq.*), Act of August 25, 1916 (16 U.S.C. 1 and 2-4) and 245 DM (42 FR 12931), as amended)

[44 FR 20427, Apr. 5, 1979]

§ 9.6 Transfers of interest.

(a) Whenever a claimant who has recorded his unpatented claim(s) with the Superintendent pursuant to the requirements of § 9.5 sells, assigns, bequeaths, or otherwise conveys all or any part of his interest in his claim(s), the Superintendent shall be notified within 60 days after completion of the transfer of: The name of the claim(s) involved; the name and legal address of the person to whom an interest has been sold, assigned, bequeathed, or otherwise transferred; and a description of the interest conveyed or received. Copies of the transfer documents will be provided by the Superintendent to the Bureau of Land Management. Failure to so notify the Superintendent shall render any existing access permit void.

(b) If the transfer occurs within the period of 12 months from the effective date of the Act and the prior owner has not recorded the unpatented claim with the Superintendent in accordance with these regulations, the holder by transfer shall have the remainder of the 12-month period to record the unpatented claim. Failure to record shall be governed by the provisions of § 9.5(c).

§ 9.7 Assessment work.

(a) An access permit and approved plan of operations must be obtained by a claimant prior to the performance of any assessment work required by Revised Statute 2324 (30 U.S.C. 28) on a claim in a unit.

(b) Permits will be issued in accordance with the following:

(1) In units subject to the surface disturbance moratorium of section 4 of the Act and § 9.4, no access permits will be granted for the purpose of performing assessment work.

(2) It has been determined that in all other units the Secretary will not challenge the validity of any unpatented claim within a unit for the failure to do assessment work during or after the assessment year commencing September 1, 1976. The Secretary expressly reserves, however, the existing right to contest claims for failure to do such work in the past. No access permits will be granted solely for the purpose of performing assessment work in these units except where claimant establishes the legal necessity for such permit in order to perform work necessary to take the claim to patent, and has filed and had approved a plan of operations as provided by these regulations. (For exploratory or development type work, see § 9.9.)

§ 9.8 Use of water.

(a) No operator may use for operations any water from a point of diversion which is within the boundaries of any unit unless authorized in writing by the Regional Director. The Regional Director shall not approve a plan of operations requiring the use of water from such source unless the right to the water has been perfected under applicable State law, has a priority date prior to the establishment of the unit and there has been a continued beneficial use of that water right.

(b) If an operator whose operations will require the use of water from a point of diversion within the boundaries of the unit can show that he has a perfected State water right junior to the reserved water right of the United States and can demonstrate that the exercise of that State water right will not diminish the Federal right, which is that amount of water necessary for the purposes for which the unit was established, he will be authorized to use water from that source for operations, if he has complied with all other provisions of these regulations.

§ 9.9 Plan of operations.

(a) No operations shall be conducted within any unit until a plan of operations has been submitted by the operator to the Superintendent and approved by the Regional Director. All operations within any unit shall be conducted in accordance with an approved plan of operations.

(b) The proposed plan of operations shall relate, as appropriate, to the proposed operations (e.g. exploratory, developmental or extraction work) and shall include but is not limited to:

(1) The names and legal addresses of the following persons: The operator, the claimant if he is not the operator, and any lessee, assignee, or designee thereof;

(2) A map or maps showing the proposed area of operations; existing roads or proposed routes to and from the area of operations; areas of proposed mining; location and description of surface facilities, including dumps;

(3) A description of the mode of transport and major equipment to be used in the operations;

(4) A description of the proposed operations and an estimated timetable for each phase of operations and the completion of operations;

(5) The nature and extent of the known deposit to be mined. When the claim is located in a National Monument in Alaska and is unpatented, a completed Supplemental Claim Information Statement shall be submitted describing the quantity, quality, and any previous production of the deposit;

(6) A mining reclamation plan demonstrating compliance with the requirements of § 9.11;

(7) All steps taken to comply with any applicable Federal, State, and local laws or regulations, including the applicable regulations in 36 CFR, Chapter I;

(8) In units subject to the surface disturbance moratorium of section 4 of the Act and § 9.4, proof satisfactory to the Regional Director that the surface of the area on which the operation is to occur was significantly disturbed for purposes of mineral extraction prior to February 29, 1976, or if the area was not so disturbed, proof, including production records for the years 1973, 1974, and 1975, that new disturbance is necessary to maintain an average annual rate of production not to exceed that of the years 1973, 1974, and 1975;

(9) An environmental report analyzing the following:

(i) The environment to be affected by the operations,

(ii) The impacts of the operations on the unit's environment,

(iii) Steps to be taken to insure minimum surface disturbance,

(iv) Methods for disposal of all rubbish and other solid and liquid wastes,

(v) Alternative methods of extraction and the environmental effects of each,

(vi) The impacts of the steps to be taken to comply with the reclamation plan, and

(10) Any additional information that is required to enable the Regional Director to effectively analyze the effects that the operations will have on the preservation, management and public use of the unit, and to make a decision regarding approval or disapproval of the plan of operations and issuance or denial of the access permit.

(c) In all cases the plan must consider and discuss the unit's Statement for Management and other planning documents, and activities to control, minimize or prevent damage to the recreational, biological, scientific, cultural, and scenic resources of the unit.

(d) Any person conducting operations on January 26, 1977, shall be required to submit a plan of operations to the Superintendent. If otherwise authorized, operations in progress on January 26, 1977, may continue for 120 days from that date without having an approved plan. After 120 days from January 26, 1977, no such operations shall be conducted without a plan approved by the Regional Director, unless access is extended under the existing permit by the Regional Director. (See § 9.10(g).)

[42 FR 4835, Jan. 26, 1977, as amended at 44 FR 11069, Feb. 27, 1979]

§ 9.10 Plan of operations approval.

(a) The Regional Director shall not approve a plan of operations:

(1) For existing or new operations if the claim was patented without surface use restriction, where the operations would constitute a nuisance in the vicinity of the operation, or would significantly injure or adversely affect federally owned lands; or

(2) For operations which had not significantly disturbed the surface of the claim for purposes of mineral extraction prior to January 26, 1977, if the claim has not been patented, or if the patent is subject to surface use restrictions, where the operations would preclude management for the purpose of preserving the pristine beauty of the unit for present and future generations, or would adversely affect or significantly injure the ecological or cultural resources of the unit. No new surface mining will be permitted under this paragraph except under this standard; or

(3) For operations which had significantly disturbed the surface of the claim for purposes of mineral extraction prior to January 26, 1977, if the claim has not been taken to patent, or the patent is subject to surface use restrictions, where the operations would constitute a nuisance in the vicinity of the operation, or would significantly injure or adversely affect federally owned lands. Provided, however, operations under this paragraph shall be limited by the provisions of § 9.4, notwithstanding the limitation of that section's applicability to the three enumerated units;

(4) Where the claim, regardless of when it was located, has not been patented and the operations would result in the destruction of surface resources, such as trees, vegetation, soil, water resources, or loss of wildlife habitat, not required for development of the claim; or

(5) Where the operations would constitute a violation of the surface disturbance moratorium of section 4 of the Act; or

(6) Where the plan does not satisfy each of the requirements of § 9.9.

(b) Within 60 days of the receipt of a proposed plan of operations, the Regional Director shall make an environmental analysis of such plan, and

(1) Notify the operator that he has approved or rejected the plan of operations; or

(2) Notify the operator of any changes in, or additions to the plan of operations which are necessary before such plan will be approved; or

(3) Notify the operator that the plan is being reviewed, but that more time, not to exceed an additional 30 days, is necessary to complete such review, and setting forth the reasons why additional time is required; *Provided, however,* That days during which the area of operations is inaccessible for such reasons as inclement weather, natural catastrophy, etc., for inspection shall not be included when computing either this time period, or that in paragraph (b) of this section; or

(4) Notify the operator that the plan cannot be considered for approval until forty-five (45) days after a final environmental impact statement, if required, has been prepared and filed with the Council on Environmental Quality.

(c) Failure of the Regional Director to act on a proposed plan of operations and related permits within the time period specified shall constitute an approval of the plan and related permits for a period of three (3) years.

(d) The Regional Director's analysis may include:

(1) An examination of the environmental report filed by the operator;

(2) An evaluation of measures and timing required to comply with reclamation requirements;

(3) An evaluation of necessary conditions and amount of the bond or security deposit to cover estimated reclamation costs;

(4) An evaluation of the need for any additional requirements in access permit; and

(5) A determination regarding the impact of this operation and the cumulative impact of all operations on the management of the unit.

(e) Prior to approval of a plan of operations, the Regional Director shall determine whether any properties included in, or eligible for inclusion in, the National Register of Historic Places or National Registry of Natural Landmarks may be affected by the proposed activity. This determination will require the acquisition of adequate information, such as that resulting from field surveys, in order to properly determine the presence of and significance of cultural resources within the area to be affected by mining operations. Whenever National Register properties or properties eligible for inclusion in the National Register would be affected by mining operations, the Regional Director shall comply with section 106 of the National Historic Preservation Act of 1966 as implemented by 36 CFR Part 800.

(1) The operator shall not injure, alter, destroy, or collect any site, structure, object, or other value of historical, archeological, or other cultural scientific importance. Failure to comply with this requirement shall constitute a violation of the Antiquities Act (16 U.S.C. 431–433) (see 43 CFR Part 3).

(2) The operator shall immediately bring to the attention of the Superintendent any cultural and/or scientific resource that might be altered or destroyed by his operation and shall leave such discovery intact until told to proceed by the Superintendent. The Superintendent will evaluate the discoveries brought to his attention, and will determine within ten (10) working days what action will be taken with respect to such discoveries.

(3) The responsibility for, and cost of investigations and salvage of such values that are discovered during operations will be that of the operator, where the claim is unpatented.

(f) The operator shall protect all survey monuments, witness corners, reference monuments and bearing trees against destruction, obliteration, or damage from mining operations, and shall be responsible for the reestablishment, restoration, or referencing of any monuments, corners and bearing trees which are destroyed, obliterated, or damaged by such mining operations.

(g) Pending approval of the plan of operations, the Regional Director may approve, on a temporary basis, the continuation of existing operations if necessary to enable timely compliance with these regulations and with Federal, State, or local laws, or if a halt to existing operations would result in an unreasonable economic burden or injury to the operator. Such work must be conducted in accordance with all applicable laws, and in a manner prescribed by the Regional Director and designed to minimize or prevent significant environmental effects.

(h) Approval of each plan of operations is expressly conditioned upon the Superintendent having such reasonable access to the claim as is necessary to properly monitor and insure compliance with the plan of operations.

§ 9.11 Reclamation requirements.

(a) As contemporaneously as possible with the operations, but in no case later than six (6) months after completion of operations and within the time specified in an approved mining reclamation plan, unless a longer period is authorized in writing by the Regional Director, each operator shall initiate reclamation as follows:

(1) Where the claim was patented without surface use restriction, the operator shall at a minimum:

(i) Remove all above ground structures, equipment, and other manmade debris used for operations; and

(ii) Rehabilitate the area of operations to a condition which would not constitute a nuisance; or would not adversely affect, injure or damage, federally owned lands.

(2) On any claim which was patented with surface use restrictions or is unpatented, each operator must take steps to restore natural conditions and processes, which steps shall include, but are not limited to:

(i) Removing all above ground structures, equipment and other manmade debris;

(ii) Providing for the prevention of surface subsidence;

(iii) Replacing overburden and spoil, wherever economically and technologically practicable;

(iv) Grading to reasonably conform the contour of the area of operations to a contour similar to that which existed prior to the initiation of operations, where such grading will not jeopardize reclamation;

(v) Replacing the natural topsoil necessary for vegetative restoration; and

(vi) Reestablishing native vegetative communities.

(b) Reclamation under paragraph (a)(2) of this section is unacceptable unless it provides for the safe movement of native wildlife, the reestablishment of native vegetative communities, the normal flow of surface and reasonable flow of subsurface waters, the return of the area to a condition which does not jeopardize visitor safety or public use of the unit, and return of the area to a condition equivalent to its pristine beauty.

(c) Reclamation required by this section shall apply to operations authorized under this part, except that all terms relating to reclamation of previously issued special use permits revoked by this part for operations to be continued under an approved plan of operations shall be incorporated into the operator's reclamation plans.

§ 9.12 Supplementation or revision of plan of operations.

(a) An approved plan of operations may require reasonable revision or supplementation to adjust the plan to changed conditions or to correct oversights.

(1) The Regional Director may initiate an alteration by notifying the operator in writing of the proposed alteration and the justification therefor. The operator shall have thirty (30) days to comment on the proposal.

(2) The operator may initiate an alteration by submitting to the Superintendent a written statement of the proposal, and the justification therefor.

(b) Any proposal initiated under paragraph (a) of this section by either party shall be reviewed and decided by the Regional Director in accordance with § 9.10. Where the operator believes he has been aggrieved by a decision under this paragraph, he may appeal the decision pursuant to § 9.14.

§ 9.13 Performance bond.

(a) Upon approval of a plan of operations the operator shall be required to file a suitable performance bond with satisfactory surety, payable to the Secretary or his designee. The bond shall be conditioned upon faithful compliance with applicable regulations, the terms and conditions of the permit, lease, or contract, and the plan of operations as approved, revised or supplemented.

(b) In lieu of a performance bond, an operator may elect to deposit with the Secretary, or his designee, cash or negotiable bonds of the U.S. Government. The cash deposit or the market value of such securities shall be at least equal to the required sum of the bond.

(c) The bond or security deposit shall be in an amount equal to the estimated cost of completion of reclamation requirements either in their entirety or in a phased schedule for their completion as set forth in the approved, supplemented or revised plan of operations.

(d) In the event that an approved plan of operations is revised or supplemented in accordance with § 9.12, the Superintendent may adjust the amount of the bond or security deposit to conform to the plan of operations as modified.

(e) The operator's and his surety's responsibility and liability under the bond or security deposit shall continue until such time as the Superintendent determines that successful reclamation of the area of operations has occurred.

(f) When all required reclamation requirements of an approved plan of operations are completed, the Superintendent shall notify the operator that performance under the bond or security deposit has been completed and that it is released.

§ 9.14 Appeals.

(a) Any operator aggrieved by a decision of the Regional Director in connection with the regulations in this Part may file with the Regional Director a written statement setting forth in detail the respects in which the decision is contrary to, or in conflict with, the facts, the law, these regulations, or is otherwise in error. No such appeal will be considered unless it is filed with the Regional Director within thirty (30) days after the date of notification to the operator of the action or decision complained of. Upon receipt of such written statement from the aggrieved operator, the Regional Director shall promptly review the action or decision and either reverse his original decision or prepare his own statement, explaining that decision and the reasons therefor, and forward the statement and record on appeal to the Director, National Park Service, for review and decision. Copies of the Regional Director's statement shall be furnished to the aggrieved operator, who shall have 20 days within which to file exceptions to the Regional Director's decision. The Department has the discretion to initiate a hearing before the Office of Hearing and Appeals in a particular case. (See 43 CFR 4.700.)

(b) The official files of the National Park Service on the proposed plan of operations and any testimony and documents submitted by the parties on which the decision of the Regional Director was based shall constitute the record on appeal. The Regional Director shall maintain the record under separate cover and shall certify that it is the record on which his decision was based at the time it is forwarded to the Director of the National Park Service. The National Park Service shall make the record available to the operator upon request.

(c) If the Director considers the record inadequate to support the decision on appeal, he may provide for the production of such additional evidence or information as may be appropriate, or may remand the case to the Regional Director, with appropriate instructions for further action.

(d) On or before the expiration of forty-five (45) days after his receipt of the exceptions to the Regional Director's decision, the Director shall make his decision in writing: *Provided, however,* That if more than forty-five (45) days are required for a decision after the exceptions are received, the Director shall notify the parties to the appeal and specify the reason(s) for delay. The decision of the Director shall include (1) a statement of facts, (2) conclusions, and (3) reasons upon which the conclusions are based. The decision of the Director shall be the final administrative action of the agency on a proposed plan of operations.

(e) A decision of the Regional Director from which an appeal is taken shall not be automatically stayed by the filing of a statement of appeal. A request for a stay may accompany the statement of appeal or may be directed to the Director. The Director shall promptly rule on requests for stays. A decision of the Director on request for a stay shall constitute a final administrative decision.

§ 9.15 Use of roads by commercial vehicles.

(a) After January 26, 1977, no commercial vehicle shall use roads administered by the National Park Service without first being registered with the Superintendent.

(1) A fee shall be charged for such registration based upon a posted fee schedule, computed on a ton-mile basis. The fee schedule posted shall be subject to change upon 60 days notice.

(2) An adjustment of the fee may be made at the discretion of the Superintendent where a cooperative maintenance agreement is entered into with the operator.

(b) No commercial vehicle which exceeds roadway load limits specified by the Superintendent shall be used on roads administered by the National Park Service unless authorized by written permit from the Superintendent.

(c) Should a commercial vehicle used in operations cause damage to roads or other facilities of the National Park Service, the operator shall be liable for all damages so caused.

§ 9.16 Penalties.

Undertaking any operation within the boundaries of any unit in violation of this Part shall be deemed a trespass against the United States, and the penalty provisions of 36 CFR Part 1 are inapplicable to this part.

§ 9.17 Public inspection of documents.

(a) Upon receipt of the plan of operations the Superintendent shall publish a notice in the FEDERAL REGISTER advising the availability of the plan for public review.

(b) Any document required to be submitted pursuant to the regulations in this Part shall be made available for public inspection at the Office of Superintendent during normal business hours. The availability of such records for inspection shall be governed by the rules and regulations found at 43 CFR Part 2.

§ 9.18 Surface use and patent restrictions.

(a) The regulations in 43 CFR 3826.2-5 and 3826.2-6, 3826.4-1(g) and 3826.4-1(h), and 3826.5-3 and 3826.5-4 will apply to any claimant who wishes to take his claim to patent in Olympic National Park, Glacier Bay National Monument or Organ Pipe Cactus National Monument.

(b) The additional provisions of 43 CFR Subpart 3826 and 36 CFR 7.26 and 7.45(a) will continue to apply to existing permits until 120 days after January 26, 1977, unless extended by the Regional Director. (See § 9.10(g).

[42 FR 4835, Jan. 26, 1977, as amended at 48 FR 30296, June 30, 1983]

ANILCA SECTION 1110(b) - ACCESS TO INHOLDINGS

SPECIAL ACCESS AND ACCESS TO INHOLDINGS

USC 3170. SEC. 1110. (a) Notwithstanding any other provision of this Act or other law, the Secretary shall permit, on conservation system units, national recreation areas, and national conservation areas, and those public lands designated as wilderness study, the use of snowmachines (during periods of adequate snow cover, or frozen river conditions in the case of wild and scenic rivers), motorboats, airplanes, and nonmotorized surface transportation methods for traditional activities (where such activities are permitted by this Act or other law) and for travel to and from villages and homesites. Such use shall be subject to reasonable regulations by the Secretary to protect the natural and other values of the conservation system units, national recreation areas, and national conservation areas, and shall not be prohibited unless, after notice and hearing in the vicinity of the affected unit or area, the Secretary finds that such use would be detrimental to the resource values of the unit or area. Nothing in this section shall be construed as prohibiting the use of other methods of transportation for such travel and activities on conservation system lands where such use is permitted by this Act or other law.

(b) Notwithstanding any other provisions of this Act or other law, in any case in which State owned or privately owned land, including subsurface rights of such owners underlying public lands, or a valid mining claim or other valid occupancy is within or is effectively surrounded by one or more conservation system units, national recreation areas, national conservation areas, or those public lands designated as wilderness study, the State or private owner or occupier shall be given by the Secretary such rights as may be necessary to assure adequate and feasible access for economic and other purposes to the concerned land by such State or private owner or occupier and their successors in interest. Such rights shall be subject to reasonable regulations issued by the Secretary to protect the natural and other values of such lands.

REGULATIONS FOR TRANSPORTATION AND UTILITY SYSTEMS IN AND ACROSS, AND ACCESS INTO, CONSERVATION SYSTEM UNITS IN ALASKA (43 CFR 36)

United States Department of the Interior
NATIONAL PARK SERVICE
ALASKA REGIONAL OFFICE
2525 Gambell Street, Room 107
Anchorage, Alaska 99503 2892

IN REPLY REFER TO:

F86(ARO-O)

Memorandum

To: Superintendents, Regional Directorate and Regional Staff

From: Associate Regional Director, Operations

Subject: Title XI Regulations - Transportation and Utility System Units in Alaska

Comprehensive regulations governing access in Alaskan Conservation System Units (CSU) were published in the Federal Register on September 4, 1986 to become effective October 6, 1986.

These regulations codified at 43 CFR 36 apply to three bureaus: National Park Service, U.S. Fish and Wildlife Service and the Bureau of Land Management. They were codified solely at 43 CFR because of the strong interest expressed for uniformity in the meaning and application of these regulations throughout Alaska CSU's. These regulations address five groups of access and transportation categories:

1. Transportation or Utility Systems (TUS) providing general or special access across a CSU;
2. Access to inholdings;
3. Special access (snowmachines, motorboats, aircraft, etc.) within CSU's;
4. Temporary access; and
5. Special provisions for access (GAAR, YUCH, etc.)

It is important to read the regulations and the preamble to the regulations for a better understanding of why they are the way they are.

One of the most important aspects to be aware of, however, is that there are sections in these regulations that totally replace former regulations in 36 CFR 13.

The key subjects are:

1. Access to inholdings;

2. Special Access (snow machines, motorboats, aircraft, etc.) and;

3. Temporary Access.

Following is a table showing the current applicable regulation for these access categories and the former regulation which is no longer in effect:

	Current	Former
Access to Inholdings	43 CFR 36.10	36 CFR 13.15
Special	43 CFR 36.11	36 CFR 13.10 13.11 13.12 13.13 13.14
Temporary Access	43 CFR 36.12	36 CFR 13.16

Standard Form 299, Application for Transportation and Utility Systems and Facilities on Federal Lands, shall be used for all applications for transportation/utility/facility access needs (except for special access). A copy is enclosed. If you need further copies contact the Division of Lands. If you have further questions about interpretation or application of these regulations, please contact Rich O'Guin, Division of Protection and Ranger Activities.

Further guidance will be forthcoming in the near future as to approval authority, processing of applications, preparation of environmental compliance documents, regional review of applications and proposed routes, and regional coordination responsibilities for review.

Enclosures

cc:
OPR
Stenmark
OL
RMM
REC

DEPARTMENT OF THE INTERIOR

Office of the Secretary

43 CFR Part 36

Fish and Wildlife Service

50 CFR Part 36

National Park Service

36 CFR Part 13

Bureau of Land Management

Transportation and Utility Systems in and Across, and Access Into, Conservation System Units in Alaska

AGENCY: Department of the Interior.

ACTION: Final rule.

SUMMARY: This final rulemaking implements the provisions of Title XI of the Alaska National Interest Lands Conservation Act (ANILCA), 94 Stat. 2371, Pub. L. 96-487, concerning transportation and utility systems (TUS) in Alaska when any portion of the route of the system will be within any conservation system unit (CSU), national recreation area or national conservation area. These provisions detail the procedures that must be followed to obtain any Federal approval needed for a TUS. In addition, the regulations address special access, temporary access and access to inholdings.

EFFECTIVE DATE: October 6, 1986.

FOR FURTHER INFORMATION CONTACT: Ted Bingham, Bureau of Land Management, 343-5441; Cynthia deFranceaux, National Park Service, 343-4279; or Jim Gillett, Fish and Wildlife Service, 343-5333; Main Interior Building, 18th and C Streets, NW., Washington, DC 20240.

SUPPLEMENTARY INFORMATION: The proposed rulemaking implementing Title XI of ANILCA (Title XI) was published in the **Federal Register** on July 15, 1983 (48 FR 32506), with a 120-day comment period. During the comment period, timely written comments were received from 42 sources; 12 from corporations, 10 from organizations, 9 from governmental agencies, and 11 from individuals. A handful of comments were also received after the comment period had expired. In addition, hearings were held at Juneau, Fairbanks, and Anchorage, Alaska on September 12, 14, and 16, 1983, respectively. The general tenor of the comments cannot be easily characterized. Certain sections of the proposed regulations generated large numbers of comments with almost equal numbers presenting favorable and unfavorable views. Only those sections of the proposed rulemaking that were the subject of comments are discussed in this preamble. In addition to the changes discussed below, minor editorial changes were also made.

43 CFR Part 36

Section 36.1 Applicability and Scope

Several commenters recommended that the discussion of applicability and scope be broken down into sections that clearly separate the distinct situations to which the regulations apply. This suggestion has been followed in order to clarify that these regulations apply to four types of access in Alaska within or across CSUs or other special areas: (1) TUSs, (2) access to inholdings, (3) special access; and (4) temporary access.

Several commenters questioned or demonstrated confusion regarding the applicability of these regulations to all or part of a TUS which partially crosses a CSU. In response to those questions, the regulations have not been changed. It is the opinion of the Department of the Interior (Interior) that when part of a TUS crosses a CSU, the entire route of the TUS is subject to Federal approvals and to these regulations. Some commenters expressed concern that this interpretation might confer additional authority on Federal agencies; no such additional grant of authority is intended and none have been conferred by these regulations.

Several commenters stated that the regulations should expressly mention the role of the Secretary of Transportation. Section 1104(b)(2) of ANILCA clearly sets forth the situations in which the Secretary of Transportation has decision-making responsibility, or responsibility to provide planning or assistance to other Federal agencies. These are responsibilities rested by virtue of other statutes, and are not new responsibilities conferred by ANILCA. Nothing appears in these regulations regarding these responsibilities because it would be inappropriate for the Interior to make rules regarding the manner by which the Secretary of Transportation exercises his/her responsibilities.

One commenter asked whether these regulations would require an application for and govern the extension of a TUS outside of any CSU where an already constructed TUS crosses a CSU. These regulations will not apply to the extension of an existing TUS, unless the extension of the TUS causes a significant change in that part of the TUS already in existence within the CSU.

Other commenters discussed specific exclusions to the applicability of the regulations. One commenter requested that the regulations explicitly state that they apply neither to landing nor departing aircraft, nor to the passage of aircraft over CSUs. The statement is unnecessary since by their terms these regulations were not intended to apply to those situations but rather to those involving access to landing areas.

Another commenter requested that a reference be included to state that these regulations do not apply to the provisions of the Alaska Natural Gas Transportation Act of 1976 (Pub. L. 94-586). Section 1327 of ANILCA makes an exemption which will be quoted here rather than cross-referenced in the regulations. It provides:

> Nothing in this Act shall be construed as imposing any additional requirements in connection with the construction and operation of the transportation system designated by the President and approved by the Congress pursuant to the Alaska Natural Gas Transportation Act of 1976 (P.L. 94-586; 90 Stat. 2903), or imposing any limitations upon the Secretary concerning such system.

One commenter asserted that TUSs to be constructed by Federal agencies incident to their management of the CSUs should not be exempted from the effect of these regulations. The commenter suggested that there should be separate requirements for major and minor TUS needs; minor TUSs could appropriately be exempted, but major TUSs, even for management purposes, should be subject to the full procedure. This proposed approach is contrary to the express provisions of the law. In section 1102(4)(A) of ANILCA, Congress expressly exempted management of CSUs from Title XI procedures for management related TUS needs. Interior recognizes that management agency TUS needs could occasionally require major construction with significant effects. This does not mean that major systems will be constructed without consideration of potential environmental effects; proposed TUSs of any significance will normally be addressed in management, conservation or area plans involving public participation. Agencies must comply with the requirements of the National Environmental Policy Act (NEPA) of 1969 as well. For these reasons, no change has been made in the final rule in this regard.

One commenter requested clarification regarding which laws and regulations administered by which agencies are meant within the ambit of "applicable law." Following is a list of those laws and regulations which will be the source of applicable law in the majority of situations. The list is intended only for illustrative purposes. Depending upon the agency and nature of the TUS many other laws and regulations could apply such as:

Bureau of Land Management: Title V of FLPMA, 43 U.S.C. 1761 *et seq.*; 30 U.S.C. 185.

Fish and Wildlife Service: Refuge Administration Act, 16 U.S.C. 668dd, 50 CFR 29.21 *et seq.*

National Park Service: 16 U.S.C. 5 and 79; 23 U.S.C. 317 and 36 CFR 14.

None of the above-mentioned agencies have applicable laws providing the authority to approve the crossing of a designated wilderness area by a TUS. For many TUSs, the agencies can only provide the right-of-way or permit allowing use of the grounds where a TUS is proposed. Other Federal or State regulatory agencies have the authority or responsibility to approve the development of a TUS but not necessarily the authority to grant a right-of-way across certain lands.

Another commenter proposed an additional paragraph to expressly establish the precedence of these regulations over the general regulations of the Federal agencies insofar as transportation and access in Alaska CSUs are concerned. The requested statement is unnecessary. These regulations establish uniform procedures for the managing agencies to use in administering the body of applicable law pertaining to authorization and administration of TUSs. In other words, these regulations provide the procedural methodology regardless of an agency's existing regulations. However, the substantive standards of the existing statutory authorizations remain applicable to these TUSs.

One commenter stated that the areas to which these regulations apply were not clearly delineated. The proposed regulations did not list each of the CSUs and other areas subject to these regulations, but they were listed in the section-by-section analysis of the preamble. The CSUs in Alaska to which these regulations apply are as follows:

Administered by National Park Service

Alagnak National Wild River
Aniakchak National Monument and Preserve
Aniakchak National Wild River
Bering Land Bridge National Preserve
Cape Krusenstern National Monument
Charley National Wild River
Chilikadrotna National Wild River
Denali National Park and Preserve
Gates of the Arctic National Park and Preserve
Glacier Bay National Park and Preserve
John National Wild River
Katmai National Park and Preserve
Kenai Fjords National Park
Kobuk Valley National Park
Kobuk National Wild River

Lake Clark National Park and Preserve
Mulchatna National Wild River
Noatak National Preserve
Noatak National Wild River
North Fork of the Koyukuk National Wild River
Salmon National Wild River
Tinayguk National Wild River
Tlikakila National Wild River
Wrangell-Saint Elias National Park and Preserve
Yukon-Charley Rivers National Preserve

Administered by Fish and Wildlife Service

Alaska Maritime National Wildlife Refuge
Alaska Peninsula National Wildlife Refuge
Andreafsky National Wild River
Arctic National Wildlife Refuge
Becharof National Wildlife Refuge
Innoko National Wildlife Refuge
Ivishak National Wild River
Izembek National Wildlife Refuge
Kanuti National Wildlife Refuge
Kenai National Wildlife Refuge
Kodiak National Wildlife Refuge
Koyukuk National Wildlife Refuge
Nowitna National Wild River
Nowitna National Wildlife Refuge
Selawik National Wild River
Selawik National Wildlife Refuge
Sheenjek National Wild River
Tetlin National Wildlife Refuge
Togiak National Wildlife Refuge
Wind National Wild River
Yukon Delta National Wildlife Refuge
Yukon Flats National Wildlife Refuge

Administered by Bureau of Land Management

Beaver Creek National Wild River
Birch Creek National Wild River
Delta National Wild and Recreational River
Fortymile National Wild, Scenic and Recreational River
Gulkana National Wild River
Unalakleet National Wild River

Section 36.2 Definitions.

The proposed regulations defined "adequate and feasible access" in § 36.2(a). The section received a number of comments suggesting two opposite approaches. Many commenters stated that the definition should add more factors stressing environmental protection. Conversely, many commenters stated that economic considerations should be given more weight. No change was made. The definition provides enough flexibility to consider economic factors, and application processing as set forth in the regulations provided for consideration of environmental issues. We conclude that the definition originally proposed provided an adequate balance of interests. This definition was moved to section 36.10 in these final regulations because it is applicable only to access to inholdings. Further discussion of this issue can be found under that section.

The proposed regulations defined the word "area" in § 36.2(f) (§ 36.2(g) final regulations (final)). One commenter suggested that "units" was the appropriate term for areas administered by the National Park Service (NPS). Whatever the preferred general terminology for areas administered by the NPS, the areas covered by these regulations include land management units administered by the Fish and Wildlife Service (FWS) and the Bureau of Land Management (BLM) as well. The words "unit" and "area" have, however confusingly, been used interchangeably both in the law and proposed regulations. In this final rule, in order to be more uniform, the word "area" has been used whenever possible.

Section 36.2(g) of the proposed regulations (renumbered as § 36.2(f)) defined "compatible with the purposes for which the unit was established." Several commenters suggested that the definition be modified or deleted. The majority of commenters were concerned that most, if not all, proposals could be found to interfere with or detract from the purpose for which a unit was established. The majority of relevant comments suggested that the addition of "significantly" as a modifier in order to clarify that "compatible with the purposes for which the unit was established" means that the system will not significantly interfere with the purposes for which the unit was established. Interior agrees and this change was made. Other comments concerning (§ 36.2(g) § 36.2(f) final) suggested that the definition should include an express statement that the management purposes of the unit, and not just the purpose for which it was established, be considered. This change was not adopted because the management purposes of a unit are inherent in the purpose for which the unit was established, and the additional statement would be redundant.

A few comments discussed § 36.2(i) of the proposed regulations (§ 36.2(h) final). This section defines "economically feasible and prudent alternative route." These commenters requested that the definition be altered to further clarify and stress the need for economic comparisons; in particular they requested that greater weight be given to relative costs in determining the feasibility of alternate routes. After reconsideration of the proposed definition, Interior determined that a revision was called for and concluded that the definition in the proposed regulations could be improved. The new definition determines economic feasibility upon whether or not financing could be obtained for the project should the alternate route be required. In addition, the new definition provides an economic focus for determining prudence although non-economic factors could be included in the consideration. It provides that the alternate route will be considered to be prudent if the difference of its benefits minus its costs is equal to or greater than that of the benefits of the proposed TUS minus its costs. The definition allows consideration of a broad range of factors in determining prudence, such as resource and aesthetic values, as well as the impact on local populations.

A number of comments discussed the definitions of "improved rights-of-way" (§ 36.2(j) proposed regulations (proposed)) (§ 36.2(i) final), and "road" (§ 36.2(p) proposed) (deleted from the final). A number of commenters noted that many Alaskan routes would fall within the definition of "improved rights-of-way" and would not be within the definition of "roads" although they would be roads within common understanding. As the proposed regulations were drafted, many routes would have been neither "roads" nor "improved rights-of-way," and would have been inadvertently removed from the ambit of the regulations.

Many commenters also stated that the definition of "roads" was unnecessary. We agree that the definition of "roads" was confusing and unnecessary, and it has been eliminated. The definition of "improved rights-of-way" was frequently criticized. The definition pertains to section 1102(4)(b) of ANILCA which describes improved rights-of-way as the type of routes used by snow machines, air cushion vehicles, and other all-terrain vehicles. The proposed definition was taken almost verbatim from the legislative history of that section. We intend to differentiate improved rights-of-way, and eliminate from Title XI processing, those snow machine and dog sled trails that have no terrain alteration and only minor vegetation control, but which may be marked by flagging or otherwise for directional control.

One comment pertained to the definition of "other systems of general transportation" (§ 36.2(l) proposed) (§ 36.2(k) final). The commenter requested that the definition be expanded to include related facilities. This change was not made because related structures and facilities are provided for in the definition of a TUS (§ 36.2(r) proposed) (§ 36.2(p) final).

Some commenters stated that the definition of "public values" (§ 36.2(m) proposed) (§ 36.2(1) final), should be stated with more specificity. The definition was left unchanged. While stated in broad terms, it provides sufficient direction for the agencies to make rational decisions in specific cases.

Numerous comments were received on the apparent conflict between the definition of "related structures and facilities" and the definition of a TUS (§ 36.2(n) proposed) (§ 36.2(m) final). Many comments also noted the apparent discrepancy between the section-by-section analysis in the preamble and the specific wording of the proposed regulation. The preamble seemed to say that related structures and facilities were included within the TUS, as did the general language of the proposed regulation, but specific subsections of the same excluded many related structures. The exceptions were an error, and have been removed from the final regulations. The inclusion or exclusion of related facilities within the TUS will be considered on a case-by-case basis at the time an application is submitted. The test will be whether the related facility is reasonably necessary to the operation of the TUS.

Section 36.3 Preapplication

One comment was received which supported the concept of encouraging preapplication contacts. A minor change in paragraph (a) adds the words "resource concerns" in order to highlight one of the principal subjects to be addressed in any preapplication meeting. It is intended that the Federal agency express to the applicant its concerns for particular resources within the unit so the applicant may have a definite understanding of the resources and the constraints within which the applicant will be required to operate.

Varying comments expressed a broad range of views regarding the requirements for permits for preapplication activities. As the proposed regulations were drafted, all preapplication activities on lands administered by the NPS and the FWS would require permits. For lands administered by the BLM, permits would not be required for those preapplication activities which would not ordinarily cause any appreciable disturbance or damage to the lands involved and which would not ordinarily require a right-of-way or temporary use permit.

Some commenters stated that preapplication permits should be required in all situations before any preapplication work is performed. Another commenter stated that information gathering should be allowed only after the filing of an application for a TUS and that any activities having a significant effect should be postponed until their effects would be considered through the NEPA process. In addition, that commenter argued that no statutory authority exists for preapplication activities. Yet another commenter thought that some preapplication activities, such as core drilling, could impact the environment and should be addressed in a NEPA compliance document separate from the TUS environmental document.

In contrast, other commenters asserted that all preapplication activities must be allowed without any permit requirements. They reasoned that no statutory authority regulates preapplication activities; therefore, there should be no restrictions, hindrance or other formalism prior to the performance of preapplication activities. These commenters argued that if the BLM requires no permits, neither should the NPS. Additionally, special permits should be required only for those activities not otherwise permitted by the agencies under existing law or practice. Another commenter suggested that the federal agencies should be required to respond to requests for preapplication permits within 30 days of the request.

The final rule remains largely as proposed. The range of comments supports the conclusion that the proposed rule represented a reasonable approach to balance the needs of the applicants to gather information preparatory to developing an application and the needs of the managing agencies to manage the lands in a manner that is consistent with their general authorities. Approved permits or other approvals are to be issued under existing authority in accordance with NEPA requirements, agency mandates, and the purposes for which the area was established.

Another series of comments was concerned with the standard under which a preapplication activity permit would be analyzed and issued or disapproved. They sought more explicit guidance pertaining to the standard to be applied. In response, the final rule has been changed to state that the proposed preapplication activity be found by the appropriate federal agency to be compatible with the purposes for which the unit was established. Otherwise, the standards outlined in the proposed regulations have been preserved. Activities will be permitted that are necessary to adequately complete the consolidated application form for a TUS. Those activities may not cause significant or permanent damage to the values for which the unit was established; the resulting impacts from preapplication activities must be temporary, not significant, and cause no interference with other authorized uses or activities.

Several commenters noted that preapplication activities are subject to the provisions of section 810 of ANILCA (section 810) concerning the effects of activities of subsistence uses. The final rule has been modified to require an agency determination that the activities will not significantly restrict subsistence uses.

Section 36.4 Filing of Application

A number of commenters suggested that a single agency be designated for receipt of all applications. While such a procedure would be more convenient to the applicants, these regulations apply to applications for TUSs in, through or across CSUs which are under the management of four agencies, three within Interior and one within the Department of Agriculture. Interior lacks authority to issue regulations binding another Department to Interior's receipt of an application. However, these regulations have provided that a filing with one of Interior's agencies will be deemed a filing with all of them. This provision, together with preapplication procedures where applicants are urged to participate in a preapplication conference where they will be advised in the efficient preparation of their application, should simplify the filing.

A number of commenters suggested replacing the term "Standard Form 299" with "the consolidated application form." Some of these comments were based on the pending review and revision of Standard Form 299, Application for Transportation and Utility Systems and Facilities on Federal Lands (SF 299). Since the form has now been revised and reissued, there is no need for the suggested change.

Two commenters suggested that either the SF 299 be revised to specifically request all information that may ultimately be required of an applicant, or alternatively that all such information be identified during the preapplication meetings and agreed upon by the applicant. This is not possible. The SF 299 was designed to provide basic data needed by any appropriate federal agency for all types of TUSs. It is flexible enough to allow the applicant to attach any special information that may additionally be required by an agency pertaining to specific or unique types of TUSs. An application form that identified all information that might potentially be required would be extremely complex, cumbersome and unreasonable. Currently each Federal agency has regulations and informational material which specifies the type of information that must be included in an application for a specific right-of-way, lease, license, permit, etc., from that agency. These requirements can easily be identified during a preapplication session.

One commenter objected to the 15 day period during which agencies may receive applications, as contrary to law and inviting invalid applications. The law requires that applications be filed with all appropriate Federal agencies on the same day. To facilitate reasonable implementation of this provision, the proposed regulations allowed a 15 day period during which Federal agencies may receive applications, and the filing day would be deemed to be the last day on which an agency receives an application. This grace period has been preserved. It would be unnecessarily burdensome and costly to require an applicant to file the application literally on the same day in locations as diverse as Anchorage, Alaska, Seattle, Washington, and Washington, DC.

Section 36.5 Application Review

A number of commenters requested that a single agency be established as a clearinghouse for all applications. Just as Interior cannot designate a single agency to receive all applications, so it cannot designate a single agency as the clearinghouse; doing so would include agencies outside of Interior within the purview of Interior's regulations. Accordingly, no single agency can be designated as a clearinghouse.

Similarly, many commenters suggested replacing the term "appropriate Federal agency" with the term "lead agency." According to this concept, the lead agency would then assure that all other appropriate Federal agencies are involved. In order to accommodate this suggestion, the lead agency paragraph which appeared in the proposed regulations under the discussion of NEPA compliance has been brought forward in the final regulations of this section on application review. It has also been slightly revised. When the application is received, one of the four area managing agencies will be identified initially as the lead agency. For the purposes of this initial identification, the agency selected will be the agency having the most land (defined not in terms of area measurement but in terms of the most lineal surface crossed by the proposed TUS) under its jurisdiction. This procedure will allow for immediate identification of a lead agency to begin timely coordination of the application review process. The regulation also provides that another agency may ultimately be designated as the lead agency for the remainder of the process.

Several commenters were concerned with the provisions pertaining to requests for additional information. Some commenters suggested that any additional information requested be limited to that directly related to the TUS application. It is implicit in the process that any information requested must be reasonably related to the TUS application and the agency's required review. However, what is required may include any number of things that are not currently foreseeable, particularly in light of those situations where the agency may be mandated to consider viable alternatives to the specific application. Another commenter similarly suggested that additional information requested should be limited to matters discussed in the preapplication meetings. This latter suggestion would overly restrict the agency in gathering information that it may be required by law to collect before granting an application.

Interior has considerable experience in processing applications for similar types of systems as those covered under Title XI. Interior has learned that applications which supply inadequate information far outnumber those applications which are complete when initially filed. Failure to supply adequate information jeopardizes the applicant's ability to proceed with a project. The agency may be unable to prepare an Environmental Impact Statement (EIS) or may produce an inadequate EIS leading to disapproval of the application. The proposed regulations are intended to avoid this result. Therefore, no change has been made in the regulations.

Section 36.6 NEPA Compliance

Comments were received regarding compliance with section 810. This section provides a procedure for allowing public participation in the decision when a proposed activity would significantly restrict subsistence uses. Specifically, clarification was requested regarding whether the section 810 analysis and decision would be made by the lead agency. The clarification is as stated here: the lead agency will be responsible for ensuring compliance with section 810 pursuant to § 36.6(b)(4). Whether the actual compliance will be performed by each of the involved agencies, independently or in cooperation, or as a part of the NEPA process, is left to the discretion of the lead agency and other involved agencies and will be resolved on a case-by-case basis. In order to clarify that section 810 compliance is required independently of whether an EIS is required, the regulation was slightly reordered.

Two commenters noted that the Council on Environmental Quality (CEQ) regulations require public involvement to the extent practicable in the preparation of Environmental Assessments (EA). They were concerned that the statement of no public hearings being required in the preparation of an EA would be misleading. The statement has been omitted. However, the agencies are expected to follow their normal practices which ordinarily would not involve public hearings in EA preparation.

Some commenters suggested that the requirement that hearings on EISs be held in Washington, DC was unnecessary. The statute mandates that hearings be held both in Alaska and Washington, DC. The requirement is therefore necessary.

Comments were also received which suggested that the solicitation and consideration of comments be separated from the EIS hearing requirement. The final regulations have been modified accordingly.

The preamble to the proposed regulations requested comments regarding the provision on recovery of costs for EIS preparation. No comments were received. As the discussion in the preamble noted, BLM is in the process of preparing new cost recovery regulations pursuant to FLPMA section 304(b), 43 U.S.C. 1734. Under ANILCA, agencies are to recover their EIS preparation costs in a manner consistent with that provision. The BLM regulations are still not in place. Until regulations specifying the procedure for application of that provision are in place, total costs will be presumed to be recoverable. If an applicant can make a showing that a reduced assessment is justified, a new amount will be negotiated.

See BLM Instruction Memorandum 85-3721, April 9, 1985. These regulations are deferring to the interim guidance of the Instruction Memorandum and completion of the final BLM regulations by not making any attempt to more specifically define the meaning of FLPMA § 304(b).

Section 36.7 Decision Process

Comments were made opposing and favoring the use of two decision-making processes. Although two processes may cause some confusion upon a superficial reading of the regulations, two processes are required by ANILCA itself and the provisions in the regulations come directly from the statute. Where there is an already existing body of law to be applied, that law is to be followed. Where there is no law, there is a procedure created by ANILCA pursuant to which application for a TUS may be made. When there is no existing law applying to part of a TUS, there will most likely be some existing law for the other part. Some of the decision-making will therefore involve agencies which do and do not have existing authority. Those agencies that have authority will be able to process the permits and approvals and prepare the documents that will be transmitted to Congress. Those agencies that do not have authority will only be able to prepare their recommendations. The final decision on the whole project will rest with Congress, although it is not expected that Congress will revisit those determinations already made by agencies having preexisting Congressionally delegated authority.

Some commenters suggested that the proposed standards for reviewing impacts seemed to restrict an agency to considering effects occurring within its own land base. However, the regulations are not intended to have that result.

At times, NEPA requires an agency to look at impacts beyond the borders of the land within its management jurisdiction, and ANILCA does not alter the NEPA requirements. Environmental statements will continue to examine all significant impacts to the human environment including secondary and cumulative effects.

Comments were also made that the determination of significant impact under § 36.7(a)(1) should be made through a public participation process. The regulations have not been changed. The NEPA process provides a substantial opportunity for public involvement.

A few commenters also requested that the decision process specifically take into account the requirements of section 810. Accordingly, § 36.7(a)(2)(ix) has been added to require agencies to make specific findings regarding the impacts, if any, on subsistence uses.

Section 36.8 Administrative Appeal

Comments were received that § 36.8(a) provided inadequate guidance for exercising the statutory appeal rights under section 1106 of ANILCA. No change has been made because Interior cannot regulate matters outside of its jurisdiction. For that same reason Interior cannot legally provide for administrative appeals of denials issued under § 36.7(b).

Section 36.9 Issuing Permits

A few commenters suggested that all TUS right-of-way permits should include requirements to reasonably minimize adverse impacts on subsistence resources and uses. No change was made in the final regulations because this was already provided for in § 36.9(b)(5) which requires the protection of the interests of individuals living in the general area of the right-of-way permit who rely on the fish, wildlife and biotic resources of the area for subsistence purposes.

Some commenters suggested changes to the requirements for the terms and conditions. Except for adding the words "maximum and" when discussing the right-of-way width in § 36.9(b)(4), the proposed regulations repeat the statutory requirements. Accordingly, comments suggesting changes in the statutory language have not been adopted, and the words "maximum and," added to the statutory language in the proposed regulations, have been deleted.

Section 36.10 Access to Inholdings

This section is the most controversial of these regulations. Overall, the comments ranged from those recommending deletion of the entire section as unnecessary or inconsistent with area purposes, to those perceiving the section as needed, to those arguing that the access to inholdings provisions in section 1110(b) of ANILCA (1110(b)) should not be treated separately from the remainder of Title XI.

Section 36.10(b) has been modified slightly to correct an error in drafting the proposed regulation. The change clarifies that this part is to address all access issues in CSUs, and it was incorrect to also refer to "other applicable law."

A number of comments were received about the definitions pertaining to this section. The definition section has been supplemented so that the principal terms regarding or applying only to access to inholdings are found in this section rather than in the definition § 36.2.

The term "adequate and feasible access" received a number of comments. Some agreed with the interpretation followed in the proposed rule which includes all forms of access without limitation within the scope of section 36.10. Others preferred the narrower definition found in the interim or present regulations of the NPS and FWS which guaranteed access but limited it to pedestrian or vehicular means of transportation, arguing that the proposed definition was too broad. Other commenters argued that the law was intended to provide for small scale personal use access only and not pipelines or transmission lines. We have reviewed these comments and determined that the proposed definition of adequate and feasible will be retained with minor modifications. The definition has been restructured into a single sentence.

The reason for retaining the definition as stated in the proposed rule is our conclusion that it reflects Congressional intent. First, we find no justification for distinguishing between small private routes and larger systems. The criteria for applicability within the statute itself pertain to the type of inholding, not the type of system. Second, the statute clearly states that the access right is for "economic and other purposes;" not merely for ingress and egress. Third, the legislative history clearly states that the grant of access must be broadly construed:

> The Committee understands that the common law guarantees owners of inholdings access to their land, and that rights of access might also be derived from other statutory provisions, including other provisions of this title, or from constitutional grants. This provision is intended to be an independent grant *supplementary to all other rights of access,* and shall not be construed to limit or be limited by any right of access granted by the common law, other statutory provisions, or the Constitution. (emphasis supplied)
>
> H. Rept. No. 97, Part 1, 96th Congress, 1st Sess. 1979, 240; also, S. Rept. No. 413, 96th Congress 1st Sess. 1979, 249.

A number of comments stated that a definition of the terms "effectively surrounded" was necessary. A number of alternative means of deriving a definition were suggested. We have retained the definition from the proposed regulations which was based on the following excerpt from Senate Report 96–413, 96th Cong., 1st Sess., 1979, 248–249:

> The Committee adopted a specific standard regarding access which is designed to include inholders and other landowners where lands are effectively surrounded by a unit or units established by this Act. The Committee finds that in certain instances, there will be a need for access to be effected across such units and expects the Secretary to be reasonable and fair in his judgments regarding access in these situations.
>
> The most obvious situations involve those of physical barriers which would prevent feasible access except across a unit. Such barriers can include rugged mountain terrain, extensive marsh areas, shallow water depths, and presence of ice for large periods of the year. The Committee does not intend to limit the application of the term "effectively surrounded" to only those situations. Rather,

> the Committee expects the Secretary to judge these situations on a case-by-case basis and to work with the inholder to come to a reasonable solution which will assure that adequate and feasible access for economic and other purposes can be realized.

The agencies are expected to use this guidance from Congress in making determinations.

Several commenters suggested changes in the definition of "inholding." Some argued that the term should be narrowly defined to include only those property rights which are permanent in nature such as State lands, native and other privately owned lands, valid mining claims and permanent right of occupancy inherited by devise or descent at common law. Under that theory administratively created rights of occupancy which are discretionary in nature, such as leaseholds, would not be inholdings. Other comments took an opposite view and argued that the word "leasehold" should be inserted in the definition. Another comment argued that rights acquired subsequent to the passage of ANILCA are not inholdings.

Upon consideration of these comments, Interior has determined that the proposed regulation will be changed in the final rule. The proposed definition uses identical language to that set forth in 1110(b). The statute establishes the circumstances where the Secretary of the Interior is required to give such access rights as may be necessary to assure adequate and feasible access. It resolves the issues raised by the comments. For instance, 1110(b) lists the term "valid occupancy" as an interest to which it applies. This included a valid leasehold. Likewise the statute makes no distinction between inholdings in existence at the time of ANILCA or inholdings interests created subsequent to ANILCA.

Application Filing Requirements

Several commenters requested a simpler application form for access to inholdings than the SF 299 currently being used. Because of the great variety in size and nature of inholdings, the variety of potential access needs, and the potential range of environmental consequences, the agencies will continue to use SF 299 because it is adaptable to a variety of situations. However, the information required for each application should be tailored by the applicant and the applicable Federal agency. This can best be accomplished through a preapplication meeting.

In response to comments suggesting the need for multiple application to the Federal government, an alternative procedure for mining access has been inserted in the final rule. Mining claimants may address their access needs in their proposed plan of operations instead of on the SF 299. However, the appropriate Federal agency may require the mining claimant to file a SF 299, if in its discretion, more complete information is necessary.

With respect to documentation of the property interest held by an applicant, a few comments were made expressing concern that the Federal agencies ensure that inholdings are valid prior to issuing approval for access. One commenter stated that requirements for determining validity should be addressed in the regulations. Particular concern was expressed about unpatented mining claims. Interior takes the position that is not necessary to regulate the procedures to determine valid inholdings. However, Interior does expect the applicable bureaus within Interior to ensure valid rights to the greatest extent practicable.

Application Processing and NEPA Compliance

A number of commenters stated in a variety of ways that the procedures for application processing and NEPA compliance should be more specifically tailored to the needs of inholders. The procedures for the application processing and NEPA compliance provided in the proposed regulations have been retained. Because of the variety of access needs that might be applied for, the procedures must cover the complex as well as the simple access situations. However, agency processing can be tailored to the complexity of the proposal on a case-by-case basis. Applications will all be filed, reviewed and processed in the same manner as under §§ 36.4, 36.5 and 36.6. Agencies with frequent applications can however, establish internal procedures involving shorter time periods or other means of handling applications that involve minor degrees of access and have little impact on the environment.

Comments were specifically invited on proposed regulation § 36.10(h) which would have excluded applicants for access to inholdings from paying reasonable fees, charges, or rent. About one-fourth of the comments received responded to this invitation, with a nearly equal split for or against the proposed rule.

Upon further review, we find it would be inappropriate to exclude applicants for access to inholdings from paying reasonable fees. Nearly all recent legislation authorizing the granting of a right-of-way across Federal lands has required, at least, a payment for the use of Federal lands. Congress has also directed that, where identifiable, the user of public lands or resources pay a reasonable amount for such use. This policy is applicable to inholders. However, this policy should not result in unfair charges. Applicable law will apply to determine appropriate fees, which may include fee application processing, permit issuance, monitoring and land use.

Restrictions on Access

Many comments were received on § 36.10(e) which implements that portion of 1110(b) giving the Secretary of the Interior the authority to reasonably regulate access to inholdings. Some commenters argued that the regulation was too permissive in granting the landowners their choice of route. Others argued that too much discretion was given to the agencies. We have concluded that the proposed regulations have properly balanced the applicant's right of access with Interior's right to reasonably regulate. If there is an alternate, adequate and feasible route that has no or fewer significant adverse impacts on natural or cultural values, then it is reasonable the alternate route rather than the applicant's selected route be required. If the applicant's route truly jeopardizes public health or safety, then it is reasonable to use an alternate route.

Some commenters objected to reliance on management plans for guidance as to the appropriate level of access because such plans are not referenced in ANILCA. Although the law does not specifically mention management plans with respect to access to inholdings, management plans for CSUs provide background for understanding the valuable resources, concerns, public use, and management strategies pertaining to a CSU.

Appeal Process

One comment was received suggesting that the proposed regulation be amended to read: "An applicant denied a route or method of access applied for or when the method of access is deemed unnecessary under the provisions of this section may appeal. . . ." Upon further consideration of the matter of appeals relative to "guaranteed" access, the final regulation has been changed to reflect that access cannot be denied but that a particular route or method may be denied. The final agency decision is the final administrative decision.

Multiple Use Right-of-Way

The preamble to the proposed rule solicited comments on the following issue: Whether a potentially multiple use right-of-way should be for the exclusive use of the applicant or whether the right-of-way should be open to public use or the use by other inholders. Some commenters stated that the concept of multiple use should be construed to include acquisition of reciprocal rights-of-way across other private or State lands which may be crossed by a TUS outside the CSU. Others were concerned that potential impacts from a multiple use right-of-way could be considered as factors against an original applicant. The regulations would have to define the basis of sharing; that multiple impacts associated with a TUS should not be assumed and applied to the initial applicant for a TUS. One commenter stated that other potential users of an existing TUS should be required to submit an application if it sought any expansion, change in use or increased use or impacts. Another opposed opening access routes initially granted to inholders for use by the public. One commenter argued that a right-of-way granted to inholders should be closed to fee paying guests of a CSU. Another commenter stated that if an inholder assumes the costs of construction he should not have to share the access with anyone. One agency commented that it should have the right to use any access route to carry out agency function. One comment recommended that if any agency and an inholder cannot agree on exclusive use or public use, the decision should be submitted to binding arbitration.

Some commenters addressed the means of fair costs or compensation related to multiple use of a right-of-way. Various methods suggested include: reaching agreement with the original applicant for reimbursement; binding arbitration if no agreement can be reached; and as a last resort, rate, a formula involving the original cost of facilities and other related factors by vesting the original TUS builder with certain exclusive rights, which other parties to reach equitable settlement with the builder.

Considering the complexities of the multiple use of a right-of-way, it is Interior's intention to pursue this issue in further study. Until the study is completed, the issue will be dealt with on a case-by-case basis.

Section 36.11 Special Access

This section implements the provisions of section 1110(a) of ANILCA (1110(a)), concerning special access across CSUs, national recreation and national conservation areas, and those public lands designated as wilderness study areas.

Comments were received requesting a more specific definition of "adequate snow cover." The proposed regulations and the statute authorize the use of snowmachines in areas, but that use is limited to "periods of adequate snow cover or frozen river conditions." Interior agrees that the definition should be as specific as possible. In response to this comment, the definition has been revised to provide more guidance on when the snow cover will be viewed as adequate.

A number of comments were received requesting a clarification on the relationship between the provisions of this section and the subsistence provisions of Title VIII of ANILCA (Title VIII). One commenter suggested that the regulations need to define more precisely the limits upon access for subsistence activities. Nothing in this section is intended to limit or restrict the rights of rural residents as specified in Title VIII. Accordingly, a new paragraph (b) has been added to this section to clarify that the regulations contained in this section in no way restrict the rights of rural residents as specified in Title VIII and agency regulations implementing those provisions. A related question asks how the BLM will address subsistence issues, since, unlike the NPS and the FWS, it has not promulgated regulations to implement the provisions of Title VIII. BLM does not intend to promulgate Title VIII regulations in the near future, but internal BLM procedures require satisfying Title VIII requirements prior to granting a right-of-way in Alaska.

Some commenters criticized the proposed regulations on motorboat and aircraft use within areas, in that those uses are not restricted to traditional activities and travel to and from villages and homesites as in the statutory authorization. These commenters preferred the more restrictive language of the statute. Interior is of the view that it has the discretion to broaden the authorization beyond that required in the statute in light of other authorizations. Executive Order 11644 (E.O. 11644), on off-road vehicles (ORV), does not apply to motorboats or aircraft, so Interior is not limited by its requirements in authorizing these uses. After review of the impacts of these uses on the areas, including a review of the experience of the NPS and the FWS with their current regulations which are identical in addressing motorboat and aircraft use, it was decided that deleting the limiting language of the statutory authorization would not significantly increase the use of areas by motorboats and airplanes. Such use would not be in derogation of the values and purposes for which these areas were established, and would provide for greater enjoyment of these areas by visitors. Accordingly, to allow for access to the areas, the restrictions on motorboat and fixed wing aircraft use have not been increased in the final regulations.

Another commenter suggested that snowmachines should be treated, except for subsistence purposes, similar to other ORVs, in that they should be restricted to designated areas or trails. Interior views this suggested revision as contrary to the specific statutory provisions for snowmachine use in areas which is limited only to use for traditional activities and for travel to and from villages and homesites. The statutory authorization is not limited by E.O. 11644.

A number of comments were received on the ORV provisions of this section. Some argued that the proposal was too restrictive, and that the areas should be open to greater ORV use. Others argued that ORV use should be further limited to assure that the values and purposes for the areas are adequately protected. Section 1110(a) does not authorize general ORV use. Accordingly, with the exception of snowmachines, which are specifically addressed in section 1110(a), other applicable laws must be used to determine appropriate ORV use in these areas. Interior believes that as proposed, the regulation of ORVs in areas provides the proper balance between adequate ORV use and protection of the purposes and values for which the areas were established. Under these provisions, the use of ORVs in locations other than established roads and parking areas or in areas designated pursuant to E.O. 11644, is prohibited, unless pursuant to a valid permit. Under this procedure, individuals could apply for and receive permits for ORV use on existing trails in non-wilderness areas upon a finding that the use would be compatible with the purposes and values for which the areas were established. Permitted ORVs are exempted from E.O. 11644, which controls ORV use, and thus, this procedure offers the maximum ORV use allowable under current law. Persons desiring the opening of specific new trails may petition Interior to initiate rulemaking under 43 CFR Part 14, to open new trails under the provisions of E.O. 11644.

Section 36.11(g) has also been revised to clarify that areas will be designated for ORV use according to E.O. 11644 and regulations promulgated by the agencies to implement the Order. In addition, the provision in the proposed regulations that closures and openings would be according to § 36.11(h) has been deleted. Since that section has been revised to apply only to uses authorized by section 1110(a) (snowmachines, motorboats, airplanes, and nonmotorized surface transportation methods), it is no longer appropriate for closure and opening provisions of that section to apply to ORVs. Other established agency law will apply.

Some commenters suggested that a definition of "traditional activity" should be included in these regulations. Under these regulations, the use of snowmachines is limited to "for traditional activities and travel to and from villages and homesites." One suggestion was made that the regulations should limit access to traditional activities to the means traditionally employed, and should define what those means are. Another commenter argued that access for a traditional activity is only permissible in areas where the activity has traditionally occurred. Because these regulations apply to a number of areas under the administrative jurisdiction of three agencies, it has been decided that it would be unwise, and perhaps impossible to develop a definition that would be appropriate for all areas under all circumstances. Exactly what "traditional activities" are must be decided on a case-by-case basis. Once the agencies have had the opportunity to review this question for each area under their administration, it may be possible to specifically define "traditional activity" for each area. Accordingly, these regulations do not contain a definition of "traditional activity."

Other comments suggested that the provisions of this section should not apply to parks and monuments which predated ANILCA. The argument is made that Congress did not intend to open the pre-ANILCA areas to the uses described in section 1110(a), since these pre-ANILCA areas had been closed to such uses prior to the enactment of ANILCA. Interior does not find any statutory support for this position, since section 1110(a) provides no exception for the pre-ANILCA areas. Accordingly, no exception for pre-ANILCA areas is provided for in these regulations.

A number of comments were received on the aircraft provisions of this section. A few objected to any restrictions being placed upon helicopter use, arguing that helicopters are a widely used means of transportation in Alaska, and that there is no reason to distinguish helicopters from fixed-wing aircraft. Others suggested that the provisions be amended to specifically allow emergency use of helicopters in areas without a permit, and also to allow helicopter use if pursuant to a memorandum of understanding with the appropriate Federal agency. Interior does not read the statutory authorization "airplane" of section 1110(a) as including helicopters. Accordingly, it is within its discretion to restrict helicopter use. Interior's experience has shown that uncontrolled helicopter use may have negative impacts on the purposes and values for which the various areas were established, especially upon the wildlife. Accordingly, Interior believes that helicopter use must be controlled through a general permit system to protect the purposes and values for which the areas were established. However, the proposed regulations have been revised to allow for emergency use without a permit, since it would not be practical to require a permit under emergency circumstances, or use without a permit pursuant to a memorandum of understanding, since the memorandum of understanding can contain provisions to assure adequate protection of the areas.

A few commenters suggested that the words "in accordance with the paragraph" be deleted from paragraph (e)(1) of the proposed regulations, without explanation as to why the request was made. The provisions proposed to be amended read: "Fixed-wing aircraft may be landed and operated on lands and water within areas, except where such use is prohibited or otherwise restricted by the appropriate Federal agency in accordance with this paragraph." Interior agrees that the quoted language is limiting, and unnecessary. Accordingly, it has been deleted.

Comments were received suggesting that owners of downed aircraft be permitted to remove valuable parts from the aircraft at the time of rescue without a permit. The proposed regulations required a permit prior to the removal of any downed aircraft on area lands. This proposal has been modified to permit the removal of valuable aircraft parts to the extent authorized by other federal laws and regulations.

A comment was received that downed aircraft should be removed from all public lands, and should not be limited to areas administered by the NPS and the FWS. Interior agrees, and § 36.11(f)(3) has been revised accordingly.

Another commenter argued that the aircraft authorization is too broad in that it fails to restrict wheeled aircraft access to designated sites during non-winter conditions. This is contrary to Interior's reading of the statutory authorization of section 1110(a), in that the authorized use applies to "airplanes," which Interior would interpret to include wheeled aircraft.

It has also been noted that Interior does not have the authority to regulate flight paths and altitudes of aircraft. This is a function of the Federal Aviation Administration. Therefore, a technical change has been made to the language of § 36.11(f)(1) dealing with aircraft harassment of wildlife.

Closures

Some comments suggested that the regulations should specify standards for the three types of closures: emergency, temporary, and permanent. The proposed regulations, as well as the present regulations of the NPS and the FWS provide a standard only for emergency closures. No standard is provided for temporary and permanent closures. Interior agrees that standards should be provided for all types of closures developed in these regulations. The standard for closure of areas to the uses authorized by section 1110(a) is "that such use would be detrimental to the resource values of the unit or area." In reviewing the issue of the standards for closures under the provisions of section 1110(a), Interior has concluded that this standard must be applied to all types of closures developed in these regulations. For purposes of this section, only if it is determined that a proposed use otherwise authorized by this section would be detrimental to the resource values of a particular area may that area be closed to the use, unless closure is authorized under other agency law. In the proposed and present regulations, the standard established for emergency closures and restrictions is as follows: "In determining whether to close an area or restrict an activity on an emergency basis, the area manager shall be guided by factors such as public health and safety, fire danger, resource protection, protection of cultural or scientific values, subsistence uses, endangered or threatened species conservation, and other management considerations necessary to ensure that the activity or area is being managed in a manner compatible with the purposes for which the area was established." After reviewing this standard, Interior has determined that it is not appropriate for the closures provided for under this provision. Our review of section 1110(a) leads us to conclude that the closure of areas to the authorized uses (snowmachines, motorboats, airplanes, and nonmotorized surface transportation methods) should occur only under the standards of the law which this section is to implement. Accordingly, the final regulations have been amended to provide that no closure to any use authorized under this section may be made unless the "area manager determines that the use would be detrimental to the values of the unit or area."

It is Interior's view however, that these uses may be limited or restricted pursuant to other applicable law. The Secretary of the Interior has authority in the areas administered by Interior to close areas or restrict use for a variety of reasons, such as for health and safety. We do not believe that the provisions of this section of ANILCA were intended to preclude the Secretary from utilizing other statutory authorizations to restrict these uses. The proposed and interim regulations attempted to incorporate these other laws the standard, stated above, for emergency closures. After reconsideration of these closure provisions as a result of the comments made about the standard for closure under section 1110(a), Interior has determined that these regulations should be limited to closures under the authority of that section. Accordingly, by limiting these regulations to closures authorized by section 1110(a), it was determined that the category of closure "emergency" was no longer necessary, and as such is covered by other established authority. Regulations providing for the closure of areas for reasons other than under the provisions of section 1110(a) include: For the NPS, 36 CFR 1.5; for the FWS, 50 CFR 25.21; and for the BLM, 43 CFR 8364.

One commenter suggested that section 1110(a) does not require notice and hearings for temporary or emergency closures, and that the regulations should be amended to allow temporary and emergency closures for a reasonable period of time without notice and hearings. We do not believe the statute authorizes the discretion to make any closures before a notice and hearing. As with the standards discussed above, section 1110(a) does not distinguish between the various types of closures developed in these regulations. The statutory language clearly provides that the authorized uses "shall not be prohibited unless, after notice and hearing in the vicinity of the affected unit or area, the Secretary of Interior finds that such use would be detrimental to the resources values of the unit or area." Accordingly, the regulations require notice and hearing prior to any of the forms of closures.

A few commenters pointed out that the taking of fish and wildlife are addressed in the appropriate agency regulations and suggested that it not be addressed here. Since section 1110(a) does not address the taking of fish and wildlife, Interior agrees with this suggestion and it has been adopted.

One commenter suggested that the regulations be amended so that animal owners and users have to respect the private property rights of others under penalty of being required to obtain a permit which can be revoked if abuses continue. This suggestion cannot be adopted since these provisions do not apply to privately owned lands.

Another commenter suggested that the regulations require an EA or an EIS for each access request under these regulations. Interior is of the view that the provisions of NEPA will address the need for an EA or an EIS, and that the provisions of section 1110(a) did not amend those provisions. NEPA was enacted to assure that agencies adequately consider environmental impacts in proposed agency actions. Interior does not see a need to revise the requirements of NEPA for the purposes of ths special access provisions of this section.

One commenter suggested that the provisions of § 36.11(j), which provide for criminal penalties for violations of the special access provisions, be deleted entirely as being unauthorized. Interior believes that this enforcement tool is needed for these special access provisions, since, for the most part, permits are not required. Interior is authorized to promulgate this penalty provision in these regulations pursuant to the provisions of 16 U.S.C. 3 for areas administered by the NPS; 16 U.S.C. 668dd for areas administered by the FWS, and 43 U.S.C. 1733 for areas administered by the BLM.

Section 36.12 Temporary Access

Commenters suggested that reference should be made to compliance with NEPA and section 810. This has been done in § 36.12(d). One commenter suggested that this section should not include lands designated for wilderness study or managed to maintain the wilderness character. Section 1111(a) of ANILCA (1111(a)), the statutory authorization for this regulatory provision on temporary access, specifically includes these lands. Accordingly, the regulation has not been revised as suggested.

Another commenter suggested that the proposed language requiring "permanent harm" justify denial does not allow enough administrative flexibility to protect resources. This standard comes directly from the statutory provision and it supercedes any other law that might have a different standard. Therefore, the regulatory provisions has not been revised in this final rule.

One commenter noted that section 1111(a) does not distinguish between developed and undeveloped land in regard to obtaining a special access permit, but merely to "State or private land." Interior agrees with this comment, and the definition of "temporary access" has been revised in the final regulation by deleting the word "undeveloped" as a modifier to "State or private lands."

Finally, one commenter suggested that the permits issued under section 36.12 should be limited to a duration of not more than one year, and should not be renewable. The regulation does limit temporary access to one year. However, Interior believes there may be some circumstances when it would be appropriate to renew a temporary access permit and that it should not be limited by such a restriction.

Section 36.13 Special Provisions

One commenter requested more opportunity for public involvement in siting of the access for surface transportation purposes across the Gates of the Artic National Preserve in § 36.13(a). We note that the regulations, in accordance with the statutory authorization (section 201(4)(b) through (d) of ANILCA), indicate that the environmental and economic analysis for determining the route of the right-of-way is to be prepared in accordance with the procedural requirements of § 36.6, which applies to other TUSs. Interior believes section 36.6 provides ample opportunity for the public to comment, and no additional provisions concerning public involvement have been added in the final regulations. One commenter requested that § 36.13(a)(5) should be amended to add the provision that the right-of-way would be issued in accordance with the provisions of section 1107 of ANILCA, as directed by section 201(4)(d) of ANILCA. Interior agrees and reference to § 36.9 of the regulations, which implements section 1107 of ANILCA, has been added.

Finally, other commenters objected to the underlying statutory basis for this section. No changes were made to the regulations as a result of these comments.

Paperwork Reduction Act

The information collection requirements contained in this rulemaking have been approved by the Office of Management and Budget under 44 U.S.C. 3501 *et seq.* and assigned clearance numbers 1024–0026 and 1004–0060.

Economic Effect

Interior has determined that this document is not a major rule under Executive Order 12291 and certifies that this document will not have a significant economic effect on a substantial number of small entities under the Regulatory Flexibility Act, 5 U.S.C. 601 *et seq.* This finding is based on the minimal positive economic impact on salvage aircraft companies, local repair shops, filling stations, parts stores and retail outlets for access vehicles. Small entities will also be minimally impacted by the various permit provisions regarding access.

Enviromental Considerations

As requested by NEPA, Interior has prepared an EA and made a Finding of No Significant Impact. Copies of these documents are available at the address listed at the beginning of this rulemaking.

The primary authors of these regulations are William P. Horn, Assistant Secretary for Fish and Wildlife and Parks, Washington, DC; Brian Koula, Division of Conservation and Wildlife, Office of the Solicitor, Washington, DC; Richard Stenmark, Alaska Regional Office, NPS, Anchorage, Alaska; Adam Misztal, Division of Refuge Management, FWS, Washington, DC; and Theodore Bingham, Division of Rights-of-Way, BLM, Washington, DC.

Lists of Subjects

43 CFR Part 36

Alaska, Transportation, Utilities, Access, Rights-of-Way, Conservation system units.

36 CFR Part 13

Aircraft, Alaska, National parks, Penalties, Traffic regulations.

50 CFR Part 36

Alaska, Recreation and recreation areas, Traffic regulations, Wildlife refuges.

Accordingly, Titles 36, 43 and 50 are amended as set forth below.

TITLE 36—[AMENDED]

PART 13—[AMENDED]

1. The authority citation for Part 13 continues to read as follows:

Authority: 16 U.S.C. 1, 3, 462(k), 3101 et seq., § 13.65(b) also issued under 16 U.S.C. 1361, 1531.

§§ 13.10 through 13.16 [Removed and reserved]

2. Sections 13.10 through 13.16 of Title 36 are removed and reserved.

TITLE 50—[AMENDED]

PART 36—[AMENDED]

1. The authority citation for Part 36 is revised to read as follows:

Authority: 16 U.S.C. 460(k) et seq., 668dd et seq., 742(a) et seq., 3101 et seq., and 44 U.S.C. 3501 et seq.

§§ 36.21 through 36.24 [Removed and reserved]

2. Sections 36.21 through 36.24 of Title 50 are removed and reserved.

TITLE 43—[AMENDED]

Accordingly, 43 CFR is amended by adding a new Part 36 to read as follows:

PART 36—TRANSPORTATION AND UTILITY SYSTEMS IN AND ACROSS, AND ACCESS INTO, CONSERVATION SYSTEM UNITS IN ALASKA

Sec.
36.1 Applicability and scope.
36.2 Definitions.
36.3 Preapplication.
36.4 Filing of application.
36.5 Application review.
36.6 NEPA compliance and lead agency.
36.7 Decision process.
36.8 Administrative appeals.
36.9 Issuing permit.
36.10 Access to inholdings.
36.11 Special access.
36.12 Temporary access.
36.13 Special provisions.

Authority: 16 U.S.C. 1, 3, 668dd *et seq.*, and 3101 *et seq.*; 43 U.S.C. 1201.

§ 36.1 Applicability and scope.

(a) The regulations in this part apply to any application for access in the following forms within any conservation system unit (CSU), national recreation area or national conservation area within the State of Alaska which is administered by the Bureau of Land Management (BLM), Fish and Wildlife Service (FWS) or National Park Service (NPS):

(1) A transportation or utility system (TUS) is any portion of the route of the system within any of the aforementioned areas and the system is not one which the Department or agency having jurisdiction over the unit or area is establishing incident to its management of the unit or area;

(2) Access to inholdings within these areas, as well as within public lands administered by the BLM designated as wilderness study areas;

(3) Special access within these areas, as well as within public lands administered by the BLM designated as wilderness study areas;

(4) Temporery access within the aforementioned areas, as well as the National Petroleum Reserve in Alaska and public lands administered by the BLM designated as wilderness study areas or managed to maintain the wilderness character or potential thereof.

(b) Except as specifically provided in this part, applicable law shall apply with respect to the authorization and administration of TUSs.

§ 36.2 Definitions.

As used in this part, the term:

(a) "ANILCA" means the Alaska National Interest Lands Conservation Act (94 Stat. 2371; Pub. L. 96–487).

(b) "Applicable law" means a law or regulation of general applicability, other than Title XI of ANILCA, under which a Federal department or agency has jurisdiction to grant an authorization (including but not limited to, a right-of-way, permit, license, lease or certificate) without which a TUS cannot, in whole or in part, be established or operated.

(c) "Applicant" means an individual, partnership, corporation, association or other business entity, and a Federal, State or local government entity including a municipal corporation submitting an application under this part.

(d) "Appropriate Federal agency" means a Federal agency (or the agency official to whom the authority has been delegated) that has jurisdiction to grant any authorization without which a TUS cannot, in whole or in part, be established or operated.

(e) "Area" means a CSU, National Recreation Area, or National Conservation Area in Alaska administered by the NPS, the FWS or the BLM.

(f) "Compatible with the purposes for which the unit was established" means that the system will not significantly interfere with or detract from the purposes for which the area was established.

(g) "Conservation System Unit" (CSU) means any unit in Alaska of the National Park System, National Wildlife Refuge System, National Wild and Scenic Rivers System, National Trails System or the National Wilderness Preservation System administered by the NPS, the FWS or the BLM.

(h) "Economically feasible and prudent alternate route" means an alternate route must meet the requirements for being both economically feasible and prudent. To be economically feasible, the alternate route must be able to attract capital to finance its construction and an alternate route will be considered to be prudent only if the difference of its benefits minus its costs is equal to or greater than that of the benefits of the proposed TUS minus its costs.

(i) "Improved right-of-ways" means routes which are of a permanent nature and would involve substantial alteration of the terrain or vegetation such as grading and graveling of surfaces or other such construction. Trail right-of-ways which are annually or periodically marked, brushed, or broken for off-road vehicles are excluded.

(j) "Incident to its management of the unit or area" means a type of TUS which is used directly or indirectly in support of authorized activities, and which is built by or for the Federal agency which has jurisdiction over the area.

(k) "Other system of general transportation" means private and commercial transportation of passengers and/or shipment of goods or materials.

(l) "Public values" means those values relating to the purposes for which the area was established as defined by the enabling legislation for the area.

(m) "Related structures and facilities" means those structures, facilities and right-of-ways which are reasonably and minimally necessary for the construction, operation and maintenance of a TUS, and which are listed as part of the TUS on the consolidated application form, Standard Form 299, "Application for Transportation and Utility Systems and Facilities on Federal Lands" (SF 299).

(n) "Right-of-way permit" means a right-of-way permit, lease, license, certificate or other authorization for all or part of a TUS in an area.

(o) "Secretary" means the Secretary of the Interior.

(p) "Transportation or utility system" (TUS) means any of the systems listed in paragraphs (p) (1) through (7) of this section, if a portion of the route of the system will be within an area and the system is not one that the Department or agency having jurisdiction over the area is establishing incident to its management of the area. The systems shall include related structures and facilities.

(1) Canals, ditches, flumes, laterals, pipes, pipelines, tunnels and other systems for the transportation of water.

(2) Pipelines and other systems for the transportation of liquids other than water, including oil, natural gas, synthetic liquid and gaseous fuels and any refined product produced therefrom.

(3) Pipelines, slurry and emulsion systems and conveyor belts for the transportation of solid materials.

(4) Systems for the transmission and distribution of electric energy.

(5) Systems for transmission or reception of radio, television, telephone, telegraph and other electronic signals and other means of communication.

(6) Improved rights-of-way for snowmachines, air cushion vehicles and other all-terrain vehicles.

(7) Roads, highways, railroads, tunnels, tramways, airports, landing strips, docks and other systems of general transportation.

§ 36.3 Preapplication.

(a) Anyone interested in obtaining approval of a TUS is encouraged to establish early contact with each appropriate Federal agency so that filing procedures and details may be discussed, resource concerns and potential constraints may be identified, the proposal may be considered in agency planning, preapplication activities may be discussed and processing of an application may be tentatively scheduled.

(b) Reasonable preapplication activities in areas shall be permitted following a determination by the appropriate Federal agency that the activities are necessary to obtain information for filing the SF 299, that the activities would not cause significant or permanent damage to the values for which the area was established or unreasonably interfere with other authorized uses or activities and that it would not significantly restrict subsistence uses. In areas administered by the NPS or the FWS, a permit shall be obtained from the appropriate agency prior to engaging in any preapplication activities. Prior to approval and issuance of such a permit, the appropriate Federal agencies must find that the proposed preapplication activity is compatible with the purposes for which the area was established.

§ 36.4 Filing of application.

(a) A SF 299, which may be obtained from an appropriate Federal agency, shall be completed by the applicant according to the instructions on the form. The form shall be filed on the same day (except in compliance with paragraph (c) of this section) with each appropriate Federal agency from which an authorization, such as a permit, license, lease or certificate is required for the TUS. Filing with any appropriate Interior agency in Alaska shall be considered to be a filing with all of its agencies. Any filing fee required by the appropriate Federal agency pursuant to applicable law must be paid at the time of filing.

(b) Prior to filing the SF 299, the applicant shall determine whether additional information to that requested on the form is required by the appropriate Federal agencies. If so, the applicant shall file the additional information as an attachment to the SF 299.

(c) When, because of separate filing points, an applicant is not able to file with each appropriate Federal agency on the same day, the applicant shall file all applications as soon as possible. All applications must be filed within a 15 calendar day period. For purposes of the time requirements provided for in this part, the application shall not be considered to have been filed until the last appropriate Federal agency receives the application. The lead agency, determined pursuant to § 36.5(a), shall determine the date of filing or that the application was not filed within the 15 day period and inform all appropriate Federal agencies.

(d) The information collection requirements contained in these regulations have been approved by the Office of Management and Budget under 44 U.S.C. 3501 *et seq.* and assigned clearance numbers 1024–0026 and 1004.0060. The information collected by the appropriate Federal agency will be used to determine whether or not to issue a permit to obtain a benefit. A response is required to obtain or retain a benefit.

§ 36.5 Application review.

(a) When there is more than one appropriate Federal agency, the Federal agency having management jurisdiction over the longest lineal portion of the right-of-way requested in the TUS application shall be the lead agency for the purpose of coordinating appropriate Federal agency actions in the review and processing of the SF 299, as well as for the purpose of compliance with the provisions of the National Environmental Policy Act (NEPA), 42 U.S.C. 4321 *et seq.*

(1) By agreement among the appropriate Federal agencies, a different Federal agency may be designated the lead agency for any or all parts of the review, processing or NEPA compliance.

(2) Upon identification of the lead agency, other involved agencies will provide assistance as requested by the lead agency.

(b) Upon receipt of an application, the lead agency will review it and determine the filing date pursuant to § 36.4. If it is determined that the applicant has not met the 15 calendar day filing deadline, pursuant to § 36.4(c) of this part, the lead agency shall notify each appropriate Federal agency to return the application to the applicant without further action.

(c) Within 60 days of the date of filing, each appropriate Federal agency shall inform the applicant and the lead agency, in writing, whether the application on its face:

(1) Contains the required information; or

(2) Is insufficient, together with a specific listing of the additional information the applicant must submit.

(d) When the application is insufficient, the applicant must furnish the specific information requested within 30 days of receipt of notification of deficiency:

(1) If the applicant needs more time to obtain information, additional time may be granted by the appropriate Federal agency upon request of the applicant, provided the applicant agrees that the application filing date will change to the date of filing of the specific additional information.

(2) Unless extended pursuant to the provisions of paragraph (d)(1) of this section, failure of the applicant to respond within the 30 day period will result in return of the application without further action.

(3) The lead agency shall keep all appropriate Federal agencies informed of actions occurring under paragraph (d) (1) and (2) of this section in order that such agencies may note their application records accordingly.

(e) Within 30 days of the receipt of additional information requested by the appropriate Federal agency, the applicant shall be notified in writing whether the supplemental information is sufficient.

(1) If the applicant fails to provide all the requested information, the application shall be rejected and returned to the applicant along with a list of the specific deficiencies.

(2) When the applicant furnishes the additional information, the application will be reinstated, and it will be considered filed as of the date the final supplemental information is actually received by the appropriate Federal agency.

(3) The lead agency shall notify appropriate Federal agencies of any final rejection under paragraph (e)(1) of this section.

§ 36.6 NEPA compliance and lead agency.

(a) The provisions of NEPA and the Council for Environmental Quality regulations (40 CFR Parts 1500–1508) will be applied to determine whether an Environmental Assessment (EA) or an Environmental Impact Statement (EIS) is required, or that a categorical exclusion applies.

(1) The lead agency, with cooperation of all appropriate Federal agencies, shall complete an EA or a draft environmental impact statement (DEIS) within nine months of the date the SF 299 was filed.

(2) If the lead agency determines, for good cause, that the nine-month period is insufficient, it may extend such period for a reasonable specific time. Notification of the extension, together with the reasons therefore, shall be provided to the applicant and published in the **Federal Register** at least 30 days prior to the end of the nine-month period.

(3) If the lead agency determines that an EIS is not required, a Finding of No Significant Impact (FONSI) will be prepared.

(4) If an EIS is determined to be necessary, the lead agency shall hold a public hearing on the joint DEIS in Washington, DC, and at least one location in Alaska.

(5) The appropriate Federal agencies shall solicit and consider the views of other Federal departments and agencies, the Alaska Land Use Council, the State, affected units of local government in the State and affected corporations formed pursuant to the Alaska Native Claims Settlement Act. After public notice, the agencies shall receive and consider statements and recommendations regarding the application submitted by interested individuals and organizations.

(6) The lead agency shall ensure compliance with section 810 of ANILCA.

(b) When an EIS is determined to be necessary, within three months of completing the DEIS or within one year of the filing of the application, whichever is later, the lead agency shall complete the EIS and publish a notice of its availability in the **Federal Register**.

(c) Cost reimbursement.

(1) The costs to the United States of application processing, other than costs for EIS preparation and review as provided in paragraph (c)(2) of this section, shall be reimbursed by the applicant, if such reimbursement is required pursuant to the applicable law and procedures of the appropriate Federal agency incurring the costs.

(2) The reasonable administrative and other costs of EIS preparation shall be reimbursed by the applicant, according to the BLM's cost recovery procedures and regulations implementing section 304 of FLPMA, 43 U.S.C. 1734.

§ 36.7 Decision process.

There are two separate decision processes. The first is used when the appropriate Federal agencies have an applicable law to issue a right-of-way permit and the area involved is outside the National Wilderness Preservation System. The second is used when an area involved in the application is within the National Wilderness Preservation System or an appropriate Federal agency has no applicable law with respect to issuing a right-of-way permit across all or any area covered by a TUS application.

(a) When the appropriate Federal agencies have an applicable law and the area involved is outside the National Wilderness Preservation System:

(1) Within four months of the date of the notice of availability of a FONSI or final EIS, each appropriate Federal agency shall make a decision based on applicable law to approve or disapprove the TUS and so notify the applicant in writing.

(2) Each appropriate Federal agency in making its decision shall consider and make detailed findings supported by substantial evidence as to the portion of the TUS within that agency's jurisdiction, with respect to:

(i) The need for and economic feasibility of the TUS;

(ii) Alternative routes and modes of access, including a determination with respect to whether there is any economically feasible and prudent alternative to routing the system through or within an area and, if not, whether there are alternate routes or modes which would result in fewer or less severe adverse impacts upon the area;

(iii) The feasibility and impacts of including different TUSs in the same area;

(iv) Short and long term social, economic and environmental impacts of national, State or local significance, including impacts on fish and wildlife and their habitat and on rural, traditional lifestyles;

(v) The impacts, if any, on the national security interests of the United States, that may result from approval or denial of the application for the TUS;

(vi) Any impacts that would affect the purposes for which the Federal unit or area concerned was established;

(vii) Measures which should be instituted to avoid or minimize negative impacts;

(viii) The short and long term public values which may be adversely affected by approval of the TUS versus the short and long term public benefits which may accrue from such approval; and

(ix) Impacts, if any, on subsistence uses.

(3) To the extent the appropriate Federal agencies agree, the decisions may be developed jointly, singularly or in some combination thereof.

(4) If an appropriate Federal agency disapproves any portion of the TUS, the application in its entirety is disapproved and the applicant may file an

administrative appeal pursuant to section 1106(a) of ANILCA.

(b) When an area involved is within the National Wilderness Preservation System or an appropriate Federal agency has no applicable law with respect to granting all or any part of a TUS application:

(1) Within four months of the date of publication of the notice of the availability of the final EIS or FONSI, each appropriate Federal agency shall determine whether to tentatively approve or disapprove each right-of-way permit within its jurisdiction that applies with respect to the TUS and the Secretary of the Interior shall make notification pursuant to section 1106(b) of ANILCA.

(i) The Federal agency having jurisdiction over a portion of a TUS for which there is no applicable law shall recommend approval of that portion of the TUS if it is determined that:

(A) Such system would be compatible with the purposes for which the area was established; and

(B) There is no economically feasible and prudent alternate route for the system.

(ii) If there is applicable law for a portion of the TUS which is outside the National Wilderness Preservation System, the applicable law shall be applied in making the determination to approve or disapprove that portion of the TUS.

(2) The notification shall be accompanied by a statement of the reasons and findings supporting each appropriate Federal agency's position. The findings shall include, but not be limited to, the findings required in paragraph (a)(2) of this section. The notification shall also be accompanied by the final EIS, the EA or statement that a categorical exclusion applies and any comments of the public and other Federal agencies.

§ 36.8 Administrative appeals.

(a) If any appropriate Federal agency disapproves a TUS application pursuant to section 36.7(a), the applicant may appeal the denial pursuant to section 1106(a) of ANILCA.

(b) There is no administrative appeal for a denial issued under the provisions of section 36.7(b).

§ 36.9 Issuing permit.

(a) Once an application is approved under the provisions of § 36.7(a), a right-of-way permit will be issued by the appropriate Federal agency or agencies, according to that agency's authorizing statutes and regulations or, if approved pursuant to the provisions of section 36.7(b), according to the provisions of Title V of the the Federal Land Policy Management Act of 1976 (43 U.S.C. 1701) or other applicable law. The permit shall not be issued until all fees and other charges have been paid in accordance with applicable law.

(b) All TUS right-of-way permits shall include, but not be limited to, the following terms and conditions:

(1) Requirements to ensure that to the maximum extent feasible, the right-of-way is used in a manner compatible with the purposes for which the affected area was established or is managed;

(2) Requirements for restoration, revegetation and curtailment of erosion of the surface of the land;

(3) Requirements to ensure that activities in connection with the right-of-way will not violate applicable air and water quality standards and related facility siting standards established pursuant to law;

(4) Requirements, including the minimum necessary width, designed to control or prevent:

(i) Damage to the environment (including damage to fish and wildlife habitat);

(ii) Damage to public or private property; and

(iii) Hazards to public health and safety.

(5) Requirements to protect the interests of individuals living in the general area of the right-of-way permit who rely on the fish, wildlife and biotic resources of the area for subsistence purposes; and

(6) Requirements to employ measures to avoid or minimize adverse environmental, social or economic impacts.

(c) Any TUS approved pursuant to this part which occupies, uses or traverses any area within the boundaries of a unit of the National Wild and Scenic Rivers System shall be subject to such conditions as may be necessary to assure that the stream flow of, and transportation on, such river are not interfered with or impeded and that the TUS is located and constructed in an environmentally sound manner.

(d) In the case of a pipeline described in section 28(a) of the Mineral Leasing Act of 1920, a right-of-way permit issued pursuant to this part shall be issued in the same manner as a right-of-way is granted under section 28, and the provisions of subsections (c) through (j), (1) through (q), and (u) through (y) of section 28 shall apply to right-of-way permits issued pursuant to this part.

§ 36.10 Access to inholdings.

(a) This section sets forth the procedures to provide adequate and feasible access to inholdings within areas in accordance with section 1110(b) of ANILCA. As used in this section, the term:

(1) "Adequate and feasible access" means a route and method of access that is shown to be reasonably necessary and economically practicable but not necessarily the least costly alternative for achieving the use and development by the applicant on the applicant's nonfederal land or occupancy interest.

(2) "Area" also includes public lands administered by the BLM designated as wilderness study areas.

(3) "Effectively surrounded by" means that physical barriers prevent adequate and feasible access to State or private lands or valid interests in lands except across an area(s). Physical barriers include but are not limited to rugged mountain terrain, extensive marsh areas, shallow water depths and the presence of ice for large periods of the year.

(4) "Inholding" means State-owned or privately owned land, including subsurface rights of such owners underlying public lands or a valid mining claim or other valid occupancy that is within or is effectively surrounded by one or more areas.

(b) It is the purpose of this section to ensure adequate and feasible access across areas for any person who has a valid inholding. A right-of-way permit for access to an inholding pursuant to this section is required only when this part does not provide for adequate and feasible access without a right-of-way permit.

(c) Applications for a right-of-way permit for access to an inholding shall be filed with the appropriate Federal agency on a SF 299. Mining claimants who have acquired their rights under the General Mining Law of 1872 may file their request for access as a part of their plan of operations. The appropriate Federal agency may require the mining claimant applicant to file a SF 299, if in its discretion, it determines that more complete information is needed. Applicants should ensure that the following information is provided:

(1) Documentation of the property interest held by the applicant including, for claimants under the General Mining Law of 1872, as amended (30 U.S.C. 21–54), a copy of the location notice and recordations required by 43 U.S.C. 1744;

(2) A detailed description of the use of the inholding for which the applied for right-of-way permit is to serve; and

(3) If applicable, rationale demonstrating that the inholding is effectively surrounded by an area(s).

(d) The application shall be filed in the same manner as under § 36.4 and shall be reviewed and processed in accordance with §§ 36.5 and 36.6.

(e)(1) For any applicant who meets the criteria of paragraph (b) of this section, the appropriate Federal agency shall specify in a right-of-way permit the route(s) and method(s) of access across the area(s) desired by the applicant, unless it is determined that:

(i) The route or method of access would cause significant adverse impacts on natural or other values of the area and adequate and feasible access otherwise exists; or

(ii) The route or method of access would jeopardize public health and safety and adequate and feasible access otherwise exists; or

(iii) The route or method is inconsistent with the management plan(s) for the area or purposes for which the area was established and adequate and feasible access otherwise exists; or

(iv) The method is unnecessary to accomplish the applicant's land use objective.

(2) If the appropriate Federal agency makes one of the findings described in paragraph (e)(1) of this Section, another alternate route(s) and/or method(s) of access that will provide the applicant adequate and feasible access shall be specified by that Federal agency in the right-of-way permit after consultation with the applicant.

(f) All right-of-way permits issued pursuant to this section shall be subject to terms and conditions in the same manner as right-of-way permits issued pursuant to § 36.9.

(g) The decision by the appropriate Federal agency under this section is the final administrative decision.

§ 36.11 Special access.

(a) This section implements the provisions of section 1110(a) of ANILCA regarding use of snowmachines, motorboats, nonmotorized surface transportation, aircraft, as well as off-road vehicle use.

As used in this section, the term:

(1) "Area" also includes public lands administered by the BLM and designated as wilderness study areas.

(2) "Adequate snow cover" shall mean snow of sufficient depth, generally 6–12 inches or more, or a combination of snow and frost depth sufficient to protect the underlying vegetation and soil.

(b) Nothing in this section affects the use of snowmobiles, motorboats and nonmotorized means of surface transportation traditionally used by rural residents engaged in subsistence activities, as defined in Tile VIII of ANILCA.

(c) The use of snowmachines (during periods of adquate snow cover and frozen river conditions) for traditional activities (where such activities are permitted by ANILCA or other law) and for travel to and from villages and homesites and other valid occupancies is permitted within the areas, except where such use is prohibited or otherwise restricted by the appropriate Federal agency in accordance with the procedures of paragraph (h) of this section.

(d) Motorboats may be operated on all area waters, except where such use is prohibited or otherwise restricted by the appropriate Federal agency in accordance with the procedures of paragraph (h) of this section.

(e) The use of nonmotorized surface transportation such as domestic dogs, horses and other pack or saddle animals is permitted in areas except where such use is prohibited or otherwise restricted by the appropriate Federal agency in accordance with the procedures of paragraph (h) of this section.

(f) Aircraft.

(1) Fixed-wing aircraft may be landed and operated on lands and waters within areas, except where such use is prohibited or otherwise restricted by the appropriate Federal agency, including closures or restrictions pursuant to the closures of paragraph (h) of this section. The use of aircraft for access to or from lands and waters within a national park or monument for purposes of taking fish and wildlife for subsistence uses therein is prohibited, except as provided in 36 CFR 13.45. The operation of aircraft resulting in the harassment of wildlife is prohibited.

(2) In imposing any prohibitions or restrictions on fixed-wing aircraft use the appropriate Federal agency shall:

(i) Publish notice of prohibition or restrictions in "Notices to Airmen" issued by the Department of Transportation; and

(ii) Publish permanent prohibitions or restrictions as a regulatory notice in the United States Flight Information Service "Supplement Alaska."

(3) Except as provided in paragraph (f)(3)(i) of this section, the owners of any aircraft downed after December 2, 1980, shall remove the aircraft and all component parts thereof in accordance with procedures established by the appropriate Federal agency. In establishing a removal procedure, the appropriate Federal agency is authorized to establish a reasonable date by which aircraft removal operations must be complete and determine times and means of access to and from the downed aircraft.

(i) The appropriate Federal agency may waive the requirements of this paragraph upon a determination that the removal of downed aircraft would constitute an unacceptable risk to human life, or the removal of a downed aircraft would result in extensive resource damage, or the removal of a downed aircraft is otherwise impracticable or impossible.

(ii) Salvaging, removing, possessing or attempting to salvage, remove or possess any downed aircraft or component parts thereof is prohibited, except in accordance with a removal procedure established under this paragraph and as may be controlled by the other laws and regulations.

(4) The use of a helicopter in any area other than at designated landing areas pursuant to the terms and conditions of a permit issued by the appropriate Federal agency, or pursuant to a memorandum of understanding between the appropriate Federal agency and another party, or involved in emergency or search and rescue operations is prohibited.

(9) Off-road vehicles.

(1) The use of off-road vehicles (ORV) in locations other than established roads and parking areas is prohibited, except on routes or in areas designated by the appropriate Federal agency in accordance with Executive Order 11644, as amended or pursuant to a valid permit as prescribed in paragraph (g)(2) of this section or in §§ 36.10 or 36.12.

(2) The appropriate Federal agency is authorized to issue permits for the use of ORVs on existing ORV trails located in areas (other than in areas designated as part of the National Wilderness Preservation System) upon a finding that such ORV use would be compatible with the purposes and values for which the area was established. The appropriate Federal agency shall include in any permit such stipulations and conditions as are necessary for the protection of those purposes and values.

(h) Closure procedures.

(1) The appropriate Federal agency may close an area on a temporary or permanent basis to use of aircraft, snowmachines, motorboats or nonmotorized surface transportation only upon a finding by the agency that such use would be detrimental to the resource values of the area.

(2) Temporary closures.

(i) Temporary closures shall not be effective prior to notice and hearing in the vicinity of the area(s) directly affected by such closures and other locations as appropriate.

(ii) A temporary closure shall not exceed 12 months.

(3) Permanent closures shall be published by rulemaking in the **Federal Register** with a minimum public comment period of 60 days and shall not be effective until after a public hearing(s) is held in the affected vicinity and other locations as deemed appropriate by the appropriate Federal agency.

(4) Temporary and permanent closures shall be (i) publishing at least once in a newspaper of general circulation in Alaska and in a local newspaper, if available; posted at community post offices within the vicinity affected; made available for broadcast on local radio stations in a manner reasonably calculated to inform residents in the affected vicinity; and designated or a map which shall be available for public inspection at the office of the appropriate Federal agency and other places convenient to the public; or (ii) designated by posting the area with appropriate signs; or (iii) both.

(5) In determining whether to open an area that has previously been closed pursuant to the provisions of this section, the appropriate Federal agency shall provide notice in the **Federal Register** and shall, upon request, hold a hearing in the affected vicinity and other locations as appropriate prior to making a final determination.

(6) Nothing in this section shall limit the authority of the appropriate Federal agency to restrict or limit uses of an area under other statutory authority.

(i) Except as otherwise specifically permitted under the provisions of this section, entry into closed areas or failure to abide by restrictions established under this section is prohibited.

(j) Any person convicted of violating any provision of the regulations contained in this section, or as the same may be amended or supplemented, may be punished by a fine or by imprisonment in accordance with the penalty provisions applicable to the area.

§ 36.12 Temporary access.

(a) For the purposes of this section, the term:

(1) "Area" also includes public lands administered by the BLM designated as wilderness study areas or managed to maintain the wilderness character or potential thereof, and the National Petroleum Reserve—Alaska.

(2) "Temporary access" means limited, short-term (i.e., up to one year from issuance of the permit) access which does not require permanent facilities for access to State or private lands.

(b) This section is applicable to State and private landowners who desire temporary access across an area for the purposes of survey, geophysical, exploratory and other temporary uses of such non-federal lands, and where such temporary access is not affirmatively provided for in §§ 36.10 and 36.11. State and private landowners meeting the criteria of §36.10(b) are directed to use the procedures of § 36.10 to obtain temporary access.

(c) A landowner requiring temporary access across an area for survey, geophysical, exploratory or similar temporary activities shall apply to the appropriate Federal agency for an access permit by providing the relevant information requested in the SF 299.

(d) The appropriate Federal agency shall grant the desired temporary access whenever it is determined, after compliance with the requirements of NEPA, that such access will not result in permanent harm to the area's resources. The area manager shall include in any permit granted such stipulations and conditions on temporary access as are necessary to ensure that the access granted would not be inconsistent with the purposes for which the area was established and to ensure that no permanent harm will result to the area's resources and section 810 of ANILCA is complied with.

§ 36.13 Special provisions.

(a) Gates of the Arctic National Park and Preserve.

(1) Access for surface transportation purposes across Gates of the Arctic National Park and Preserve (from the Ambler Mining District to the Alaska Pipeline Haul Road (Dalton Highway)) shall be permitted in accordance with the provisions of this section.

(2) Upon the filing of an application in accordance with section 36.4 for a right-of-way across the western (Kobuk River) unit of the preserve, including the Kobuk Wild River, the Secretary shall give notice in the **Federal Register**, and other such notice as may be appropriate, of a 30 day period for other applicants to apply for access. The original application and any additional applications received during the 30 day period will be reviewed in accordance with section 36.5.

(3) The Secretary and the Secretary of Transportation shall jointly prepare an environmental and economic analysis solely for the purpose of determining the most desirable route for the right-of-way and terms and conditions which may be required for the issuance of that right-of-way. This analysis shall be completed within one year and the draft thereof within nine months of the receipt of the application and shall be prepared in lieu of an EIS which would otherwise be required under section 102(2)(C) of NEPA. This analysis shall be deemed to satisfy all requirements of that Act and shall not be subject to judicial review. This analysis shall be prepared in accordance with the procedural requirements of § 36.6.

(4) The Secretaries, in preparing this analysis, shall consider the following:

(i) Alternate routes including the consideration of economically feasible and prudent alternate routes across the preserve which would result in fewer, or less severe, adverse impacts upon the preserve.

(ii) The environmental, social and economic impacts of the right-of-way including impacts upon wildlife, fish, and their habitat, and rural and traditional lifestyles including subsistence activities and measures which should be instituted to avoid or minimize negative impacts and enhance positive impacts.

(5) Within 60 days of the completion of the enviornmental and economic analysis, the Secretaries shall jointly agree upon a route for issuance of the right-of-way across the preserve. Such right-of-way shall be issued in accordance with the provisions of § 36.9.

(b) Yukon-Charley Rivers National Preserve.

(1) Any application filed by Doyon, Limited, for a right-of-way to provide access in a southerly direction across the Yukon River from its landholdings in the watersheds of the Kandik and Nation Rivers shall be processed in accordance with this part.

(2) No right-of-way shall be granted which would cross the Charley River or which would involve any lands within the watershed of the Charley River.

(3) An application shall be approved by the appropriate Federal agency if it is determined that there exists no economically feasible or otherwise reasonably available alternate route.

(c) Oil and Gas Pipelines—Arctic Slope Regional Corporation.

(1) Upon the filing by Arctic Slope Regional Corporatation for an oil and gas TUS across lands identified in section 1431(j) of ANILCA, the appropriate Federal agency shall review the filing, determine the alignment and location of facilities across/on Federal lands, and issue such authorizations as are necessary with respect to the establishment of the TUS.

(2) No environmental document pursuant to NEPA shall be required.

(3) Investigations as to the proper final alignment of the pipeline and location of related facilities are at the discretion of the Federal agency and the costs associated with such investigations are not recoverable under § 36.36.

(d) Forty Mile Component of National Wild and Scenic Rivers System. The classification of segments of the Forty Mile Components as Wild Rivers shall not preclude access across those river segments where the appropriate Federal agency determines such access is necessary to permit commercial development of asbestos deposits in the North Fork drainage

Dated: July 2, 1986.

Ann McLaughlin,

Under Secretary.

[FR Doc. 86–19734 Filed 9–3–86; 8:45 am]

BILLING CODE 4310-70, 4310-55-M

STANDARD FORM 299(11–83)
Prescribed by DOI/USDA/DOT
P.L. 96–487 and Federal
Register Notice 6–3–81

APPLICATION FOR TRANSPORTATION AND UTILITY SYSTEMS AND FACILITIES ON FEDERAL LANDS

FORM APPROVED
OMB NO. 1004–0060
Expires: May 31, 1986

NOTE: Before completing and filing the application, the applicant should completely review this package and schedule a preapplication meeting with representatives of the agency responsible for processing the application. Each agency may have specific and unique requirements to be met in preparing and processing the application. Many times, with the help of the agency representative, the application can be completed at the preapplication meeting.

FOR AGENCY USE ONLY
Application Number
Date filed

1. Name and address of applicant *(include zip code)*

2. Name, title, and address of authorized agent if different from Item 1 *(include zip code)*

3. TELEPHONE *(area code)*
Applicant
Authorized Agent

4. As applicant are you? *(check one)*
   - a. ☐ Individual
   - b. ☐ Corporation *
   - c. ☐ Partnership/Association *
   - d. ☐ State Government/State Agency
   - e. ☐ Local Government
   - f. ☐ Federal Agency

   ** If checked, complete supplemental page*

5. Specify what application is for: *(check one)*
   - a. ☐ New authorization
   - b. ☐ Renew existing authorization No. ________________.
   - c. ☐ Amend existing authorization No. ________________.
   - d. ☐ Assign existing authorization No. ________________.
   - e. ☐ Existing use for which no authorization has been received *
   - f. ☐ Other *

   ** If checked, provide details under Item 7*

6. If an individual, or partnership are you a citizen(s) of the United States? ☐ Yes ☐ No

7. Project description *(describe in detail)*: (a) Type of system or facility, *(e.g., canal, pipeline, road)*; (b) related structures and facil
ties; (c) physical specifications *(length, width, grading, etc.)*; (d) term of years needed; (e) time of year of use or operation; (f) Vo
ume or amount of product to be transported; (g) duration and timing of construction; and (h) temporary work areas needed for constru
tion. *(Attach additional sheets, if additional space is needed.)*

8. Attach map covering area and show location of project proposal

9. State or local government approval: ☐ Attached ☐ Applied for ☐ Not required

10. Nonreturnable application fee: ☐ Attached ☐ Not required

11. Does project cross international boundary or affect international waterways? ☐ Yes ☐ No *(If "yes," indicate on map)*

12. Give statement of your technical and financial capability to construct, operate, maintain, and terminate system for which authorizatio
is being requested.

(Continued on reverse)

13a. Describe other reasonable alternative routes and modes considered.

b. Why were these alternatives not selected?

c. Give explanation as to why it is necessary to cross Federal lands.

14. List authorizations and pending applications filed for similar projects which may provide information to the authorizing agency. *(Specify number, date, code, or name.)*

15. Provide statement of need for project, including the economic feasibility and items such as: (a) cost of proposal *(construction, operation, and maintenance)*; (b) estimated cost of next best alternative; and (c) expected public benefits.

16. Describe probable effects on the population in the area, including the social and economic aspects, and the rural lifestyles.

17. Describe likely environmental effects that the proposed project will have on: (a) air quality; (b) visual impact; (c) surface and ground water quality and quantity; (d) the control or structural change on any stream or other body of water; (e) existing noise levels; and (f) the surface of the land, including vegetation, permafrost, soil, and soil stability.

18. Describe the probable effects that the proposed project will have on: (a) populations of fish, plant, wildlife, and marine life, including threatened and endangered species; and (b) marine mammals, including hunting, capturing, collecting, or killing these animals.

19. Name all the Department(s)/Agency(ies) where this application is being filed.

I HEREBY CERTIFY, That I am of legal age and authorized to do business in the State and that I have personally examined the information contained in the application and believe that the information submitted is correct to the best of my knowledge.

Signature of Applicant	Date

Title 18, U.S.C. Section 1001, makes it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious, or fraudulent statements or representations as to any matter within its jurisdiction.

APPLICATION FOR TRANSPORTATION AND UTILITY SYSTEMS AND FACILITIES ON FEDERAL LANDS

GENERAL INFORMATION
ALASKA NATIONAL INTEREST LANDS

This application will be used when applying for a right-of-way, permit, license, lease, or certificate for the use of Federal lands which lie within conservation system units and National Recreation or Conservation Areas as defined in the Alaska National Interest Lands Conservation Act. Conservation system units include the National Park System, National Wildlife Refuge System, National Wild and Scenic Rivers System, National Trails System, National Wilderness Preservation System, and National Forest Monuments.

Transportation and utility systems and facility uses for which the application may be used are:

1. Canals, ditches, flumes, laterals, pipes, pipelines, tunnels, and other systems for the transportation of water.
2. Pipelines and other systems for the transportation of liquids other than water, including oil, natural gas, synthetic liquid and gaseous fuels, and any refined product produced therefrom.
3. Pipelines, slurry and emulsion systems, and conveyor belts for transportation of solid materials.
4. Systems for the transmission and distribution of electric energy.
5. Systems for transmission or reception of radio, television, telephone, telegraph, and other electronic signals, and other means of communications.
6. Improved rights-of-way for snow machines, air cushion vehicles, and all-terrain vehicles.
7. Roads, highways, railroads, tunnels, tramways, airports, landing strips, docks, and other systems of general transportation.

This application *must* be filed simultaneously with each Federal department or agency requiring authorization to establish and operate your proposal.

In Alaska, the following agencies will help the applicant file an application and identify the other agencies the applicant should contact and possibly file with:

Department of Agriculture
Regional Forester, Forest Service (USFS)
Federal Office Building, P.O. Box 1628
Juneau, Alaska 99802
Telephone: (907) 588–7247 *(or a local Forest Service Office)*

Department of Interior
Bureau of Indian Affairs (BIA)
Juneau Area Office, P.O. Box 3–8000
Juneau, Alaska 99802
Telephone: (907) 586–7209

Bureau of Land Management (BLM)
701 C Street, Box 13
Anchorage, Alaska 99513
Telephone: (907) 271–5055 *(or a local BLM Office)*

National Park Service (NPS)
Alaska Regional Office, 540 West 5th Avenue, Room 202
Anchorage, Alaska 99501
Telephone: (907) 271–4196

U.S. Fish & Wildlife Service (FWS)
Office of the Regional Director
1011 East Tudor Road
Anchorage, Alaska 99503
Telephone: (907) 276–3800

Note-Filings with any Interior agency may be filed with any office noted above or with the: Office of the Secretary of the Interior, Regional Environmental Officer, Box 120, 1675 C Street, Anchorage, Alaska 99513.

Department of Transportation
Federal Aviation Administration
Alaska Region AAL–4, P.O. 14
Anchorage, Alaska 99513

NOTE – The Department of Transportation has established the above central filing point for agencies within that Department. Affected agencies are: Federal Aviation Administration (FAA), Coast Guard (USCG), Federal Highway Administration (FHWA), Federal Railroad Administration (FRA).

OTHER THAN ALASKA NATIONAL INTEREST LANDS

Use of this form is not limited to National Interest Conservation Lands of Alaska.

Individual departments/agencies may authorize the use of this form by applicants for transportation and utility systems and facilities on other Federal lands outside those areas described above.

For proposals located outside of Alaska, applications will be filed at the local agency office or at a location specified by the responsible Federal agency.

SPECIFIC INSTRUCTIONS
(Items not listed are self-explanatory)

Item

7 Attach preliminary site and facility construction plans. The responsible agency will provide instructions whenever specific plans are required.

8 Generally, the map *must* show the section(s), township(s), and range(s) within which the project is to be located. Show the proposed location of the project on the map as accurately as possible. Some agencies require detailed survey maps. The responsible agency will provide additional instructions.

9, 10, and 12 – The responsible agency will provide additional instructions.

13 Providing information on alternate routes and modes in as much detail as possible, discussing why certain routes or modes were rejected and why it is necessary to cross Federal lands will assist the agency(ies) in processing your application and reaching a final decision. Include only reasonable alternate routes and modes as related to current technology and economics.

14 The responsible agency will provide instructions.

15 Generally, a simple statement of the purpose of the proposal will be sufficient. However, major proposals located in critical or sensitive areas may require a full analysis with additional specific information. The responsible agency will provide additional instructions.

16 through 18 – Providing this information in as much detail as possible will assist the Federal agency(ies) in processing the application and reaching a decision. When completing these items, you should use sound judgment in furnishing relevant information. For example, if the project is not near a stream or other body of water, *do not* address this subject. The responsible agency will provide additional instructions.

Application *must* be signed by the applicant or applicant's authorized representative.

If additional space is needed to complete any item, please put the information on a separate sheet of paper and identify it as "Continuation of Item".

(For supplemental, see reverse)

SUPPLEMENTAL

NOTE: The responsible agency(ies) will provide additional instructions.	CHECK APPROPRIAT BLOCK	
I – PRIVATE CORPORATIONS	ATTACHED	FILED*
a. Articles of Incorporation	☐	☐
b. Corporation Bylaws	☐	☐
c. A certification from the State showing the corporation is in good standing and is entitled to operate within the State.	☐	☐
d. Copy of resolution authorizing filing	☐	☐
e. The name and address of each shareholder owning 3 percent or more of the shares, together with the number and percentage of any class of voting shares of the entity which such shareholder is authorized to vote and the name and address of each affiliate of the entity together with, in the case of an affiliate controlled by the entity, the number of shares and the percentage of any class of voting stock of that affiliate owned, directly or indirectly, by that entity, and in the case of an affiliate which controls that entity, the number of shares and the percentage of any class of voting stock of that entity owned, directly or indirectly, by the affiliate.	☐	☐
f. If application is for an oil or gas pipeline, describe any related right-of-way or temporary use permit applications, and identify previous applications.	☐	☐
g. If application is for an oil and gas pipeline, identify all Federal lands by agency impacted by proposal.	☐	☐
II – PUBLIC CORPORATIONS		
a. Copy of law forming corporation	☐	☐
b. Proof of organization	☐	☐
c. Copy of Bylaws	☐	☐
d. Copy of resolution authorizing filing	☐	☐
e. If application is for an oil or gas pipeline, provide information required by Item "I-f" and "I-g" above.	☐	☐
III – PARTNERSHIP OR OTHER UNINCORPORATED ENTITY		
a. Articles of association, if any	☐	☐
b. If one partner is authorized to sign, resolution authorizing action is	☐	☐
c. Name and address of each participant, partner, association, or other	☐	☐
d. If application is for an oil or gas pipeline, provide information required by Item "I-f" and "I-g" above.	☐	☐

* If the required information is already filed with the agency processing this application and is current, check block entitled "Filed." Provide the file identification information (*e.g., number, date, code, name*). If not on file or current, attach the requested information.

NOTICE

The Privacy Act of 1974 provides that you be furnished the following information in connection with information required by this application for an authorization.

AUTHORITY: 16 U.S.C. 310; 5 U.S.C. 301.

PRINCIPLE PURPOSE: The information is to be used to process the application.

ROUTINE USES: (1) The processing of the applicant's request for an authorization. (2) Documentation for public information. (3) Transfer to appropriate Federal agencies when concurrence is required prior to granting a right in public lands or resources. (4)(5) Information from the record and/or the record will be transferred to appropriate Federal, State, local or foreign agencies, when relevant to civil, criminal or regulatory investigations or prosecutions.

EFFECT OF NOT PROVIDING INFORMATION: Disclosure of the information is voluntary. If all the information is not provided, the application may be rejected.

DATA COLLECTION STATEMENT

The Federal agencies collect this information from applicants requesting right-of-way, permit, license, lease, or certification for the use of Federal lands.

The Federal agencies use this information to evaluate the applicant's proposal.

The public is obligated to respond to this information request if they wish to obtain permission to use Federal lands.

* U.S. Government Printing Office 1989—480-163/30391

APPENDIX 16. REGULATORY PROGRAM OF THE U.S. ARMY CORPS OF ENGINEERS, ALASKA DISTRICT

The U.S. Army Corps of Engineers (COE) is the federal permitting agency for work proposed in waters and wetlands. Within the state of Alaska, this program is administered by the U.S. Army Engineer District, Alaska.

As its primary regulatory responsibilities, the COE has jurisdiction over navigable or tidally influenced waters, the excavation of material from navigable waters, the obstruction or alteration of navigable waters, and the placement of dredged or fill material into waters of the United States, including wetlands.

Work proposed in navigable waters of the United States is subject to section 10 or the Rivers and Harbors Act of 1899. This Act requires a Department of the Army (DA) permit be obtained prior to performance of any construction or activity that alters the course, current, condition, or navigable capacity of a navigable water.

Work proposed in water of the United States is subject to the Clean Water Act (PL 92-500). Section 301 of the act requires that a DA permit be obtained prior to the placement of dredged or fill material into waters, including wetlands. Permit specifications are identified in section 404.

Within the park study areas no navigable waters subject to section 10 of the Rivers and Harbors Act of 1899 are present. However, extensive areas subject to section 404 of the Clean Water Act (PL 92-500) are present.

The regulations implementing the COE's permit program are found at 33 CFR 320 et seq. As identified in the regulations, the COE's mandate is to consider the public interest when determining whether proposed work should be authorized. No work shall be permitted unless it is found to be in the public interest. Further, waters of the United States and a regulated activity are not restricted by land ownership. A COE permit may be required for work proposed on private land as well as for work proposed on public land.

If a proposed project is located in an area subject to COE jurisdiction and requires issuance of a permit, a formal application must be submitted. A public notice describing the proposed work would be prepared and issued to other federal, state, and local agencies and to members of the public for review and comment. If the project is controversial, a public hearing may also be held. In addition to review of the proposed project by other agencies and individuals, the COE conducts its own public interest review.

The decision to issue a permit will be based on an evaluation of the probable impacts, including the cumulative impacts, of the proposed activity and its intended use on the public interest. The benefits which reasonably may be expected to accrue from the proposal must be balanced against its reasonably foreseeable detriments. All factors which may be relevant to the proposal must be considered including the cumulative effects thereof. Among the factors considered are conservation, economics, aesthetics, general environmental concerns, wetlands, historic properties, fish and wildlife values, flood hazards, land use, navigation, safety, and the needs and welfare of the people among others.

As a result of the public interest review, proposed work may be authorized, denied, or issued with special conditions. Additionally, an applicant may be requested to modify potentially detrimental aspects of the proposed work to comply with the intent of the Clean Water Act (PL 92-500) or to other laws that apply to the review process.

Activity in National Park System units must be through individual permits. General permits and abbreviated processing procedures do not apply in park units.

Though not considered to be an inclusive list, many of the activities associated with placer mining subject to COE authority are identified below. Additional information on work subject to COE authority may be found in the COE's regulations.

For projects reviewed under individual permit application procedures, the COE will also evaluate each project under the section 404(b)(1) Guidelines prepared jointly by the COE and the EPA (40 CFR Part 230). In addition to determining whether the proposed work meet standards established by the Guidelines, the section

404(b)(1) analysis includes a review of project alternative in an effort to avoid or minimize anticipate adverse impacts to aquatic values.

The COE's Regulatory Branch will assist any individual, agency, company, or corporation in determining whether issuance of a permit for proposed work is required. More detailed information concerning the regulation of activities associated with placer mining, may be obtained by writing to the COE at the following address:

Regulatory Branch
Alaska District
U.S. Army Corps of Engineers
P.O. Box 898
Anchorage, Alaska 99506-0898
or by telephoning **(907) 753-2712** or toll free at **(800) 478-2712.**

ACTIVITIES SUBJECT TO SECTION 404 OF THE CLEAN WATER ACT (PL92-500)

The following activities associated with placer mining are subject to section 404 of the Clean Water Act (PL 92-500) when performed in waters of the United States, including wetlands

- the stockpiling of overburden
- the stockpiling of placer bearing material prior to processing
- the placement of dredged and/or fill material associated with work such as stream diversions, reservoirs, impoundments, and fish bypass channels; and dams, dikes and berms related to water diversion, collection, and/or retention
- the placement of dredged and/or fill material associated with construction of roads, i.e., roads accessing the mine as well as roads located within the mined area(s). **NOTE:** Nationwide Permit Number 14 may apply for minor stream crossing
- the placement of dredged and/or fill material associated the construction of settling basins, including the construction of access roads, berms, dikes, and similar works
- the placement of dredged and/or fill material associated with the excavation of bedrock drains, drainage ditches, and similar works
- the placement of dredged and/or fill material associated with the construction of buildings, staging areas, equipment facilities, airstrips, and similar works
- the placement of dredged and/or fill material associated with reclamation

GLOSSARY

GLOSSARY

Acronyms

ADF&G	Alaska Department of Fish and Game
ANCSA	Alaska Native Claims Settlement Act
ANILCA	Alaska National Interest Lands Conservation Act
BLM	Bureau of Land Management
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CFS	Cubic Feet Per Second
DLP	Defense of Life and Property
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
FEIS	Final Environmental Impact Statement
GIS	Geographic Information System
GMP	General Management Plan
HEP	Habitat Evaluation Procedures
HSI	Habitat Suitability Index
HU	Habitat Unit
NEPA	National Environmental Policy Act
NP&P	National Park and Preserve
NPS	National Park Service
NTU	Nephlometric Turbidity Unit
RPG	Resource Protection Goal
USDA	United States Department of Agriculture
USDI	United States Department of the Interior
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey

Adit - A normally horizontal passage from the surface used to enter an underground mine. In this document, includes tunnels which have two openings to the surface.

Alkalinity - The capacity of a solution to neutralize a base.

Allochthonous - Of or pertaining to material generated outside a particular habitat but brought into that habitat, such as debris brought into a lake by a river.

Aufeis - Ice produced from overbank or out of channel flows.

Bedload - Sediment that moves by sliding, rolling, or saltating on or very near the stream bed.

Bench Placer - A placer deposited in a previous erosion cycle and now forming a terrace above the current floodplain of a stream.

Benthic Habitat - Substrate on the bottom of lakes or streams used by aquatic plants and animals.

Biomass - The amount of living matter present at any given time, usually expressed as the mass per unit area or volume of habitat.

Biota - Collective flora and fauna of any particular area.

Channelization - Any modification of a stream which reroutes its course or increases average water velocity.

GLOSSARY

Class I Airshed - All international parks, national wilderness areas greater than 5,000 acres and national parks greater than 6,000 acres and which were in existence on August 7, 1977. Minimal amount of additional air pollution allowed.

Class II Airshed - All areas which are not Class I Airsheds. Moderate amount of additional air pollution allowed.

Conductivity - The ability of water to conduct an electric current. The electrical conductivity of water depends on water temperature and dissolve solid concentrations.

Component - Categories of environmental variables in the arctic grayling habitat model.

Cumulative Impact - ". . . the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time" (40 CFR 1508.6).

Cumulative Impact Methodology - A quantitative model used to analyze impacts to some of the target resources. Other target resources addressed in this document were analyzed qualitatively, without this methodology.

Direct Effect - Effects which are ". . . caused by the action and occur at the same time and place" (40 CFR 1508.8[a]).

Dissolved Solids - All solid material in solution, whether ionized or not. It does not include suspended sediment, colloids, or dissolved gases.

Ecosystem Integrity - The ability to support and maintain a balanced, integrated, adaptive community of organisms having species composition, diversity, and functional organization comparable to that of the natural habitat of the region (after Karr et al. 1986).

Embeddedness - The degree to which gravel-sized particles and larger are surrounded or enclosed with sand or silt.

Environmental Variable - Attributes of target resources used to actually measure impacts on the resource. Part of the Cumulative Impact Methodology.

Existing Conditions - The status of a target resource that occurred in the study area as of 1986. Existing conditions incorporate past impacts on the resource.

Future Impact - Mining impacts which would occur from the mineral development scenario. Also, future nonmining impacts which are reasonably foreseeable.

Fluvial - Produced by stream action.

Geographic Information System (GIS) - a computer stored, map data base used extensively for analysis in the cumulative impact methodology.

Groundwater - Water located below the earth surface.

Hardness - A measure of polyvalent ions dissolved in water usually reported as an equivalent concentration of calcium carbonate ($CaCO_3$). These ions are primarily calcium and magnesium. Water hardness is commonly classified as soft (0-75 mg/l as $CaCO_3$), moderately hard (75-150 mg/l as $CaCO_3$), hard (150-300 mg/l as $CaCO_3$), or very hard (300 mg/l and up as $CaCO_3$)

Hazardous Material - Any material or combination of materials which pose a substantial present or potential hazard to human health or living organisms because such materials are nondegradable, or because they can be lethal, or because they may otherwise cause detrimental cumulative effects

Indirect Effect - Effects which are ". . . caused by the action and are later in time or farther removed in distance" (40 CFR 1508.8[b]).

Invertebrate Drift - Aquatic insects and other macroinvertebrates suspended in or floating on water and whose locomotion depends on water currents.

Lode Mining - Hardrock, often underground mining following a vein or lode of mineral-bearing ore. The mineral is usually chemically separated from the ore.

Long-Term Effect - For the aquatic ecosystem resource, the impact which is still present after active mining ceases. For wildlife habitat resources, the area of physical, vegetative disturbance.

Mineral Development Scenario - A prediction of where and to what degree mining will occur in the reasonably foreseeable future. Future mining impacts were estimated from this scenario.

Mining Claim - A parcel of land appropriated for federal locatable minerals (e.g., gold, silver, lead, and copper) on federal public domain lands open to mineral entry according to the Mining Law of 1872. Almost all NPS units, when created by an act of Congress or presidential proclamation, were closed to mineral entry under the U.S. mining laws. The Mining in the Parks Act of 1976 closed to the location of mining claims the last six NPS units which remained opened to mineral entry under their enabling acts or other statutes.

Mining Impact - Can include (1) past or future impacts from the actual extraction of minerals; or (2) impacts from access for mining purposes.

Morphometry - Stream form measurement.

Muck - Permanently frozen overburden overlying placer gravels in the interior of Alaska; a mix of sticky, micaceous clay, silt sand, loess, volcanic ash, organic matter and ice.

Nonmining Impact - Can include impacts from any activity not directly related to mining, such as lodges, residences, subdivisions, park visitation, or road maintenance, which occur on patented mining claims, inholdings, or federal land. Can be inside or outside a study area.

Nonpoint Source - Disseminated origin of pollution.

Patented Mining Claim - A parcel of mineral land for which the Federal Government has conveyed its title to a claimant. It usually includes both surface and subsurface estates. A patented mining claim is private property.

Past Impact - Impacts which occurred prior to 1986. Past impacts have contributed to existing conditions.

pH - Concentration of H+ ions in water measured in logarithmic units.

Placer Mining - Surface mining of stream or bench deposits in which the free mineral, usually gold, is separated from the gravels using running water.

Point Source - A known fixed origin of pollution.

Premining Conditions - An estimate of the natural conditions of a target resource as they occurred in the study area prior to the advent of mining. This condition is the baseline to which the combined amount of past and future disturbance has been compared. The allowable change on a resource, as represented by the resource protection goals are also measured from this baseline.

Primary Habitat - The land cover types selected as the most important for each of the target resource wildlife species. These land cover types are the environmental variables for that target resource. They can also include combinations with topographic features such as slope angle or elevation. Primary habitat is more specific than "general habitat," and less specific than "critical habitat."

Primary Productivity - Total quantity of green plants produced per unit time in a specific habitat.

Productivity - Inherent capacity of an environmental unit to support organisms.

Public Laws - The following public laws were cited in this document:

TITLE	NUMBER
Alaska Native Claims Settlement Act	Public Law 92-203
Alaska National Interest Lands Conservation Act	Public Law 96-487
Antiquities Act of 1906	Public Law 59-209
Clean Water Act	Public Law 92-500
Clean Air Act	Public Law 91-604
Endangered Species Act	Public Law 93-205
Fish and Wildlife Coordination Act	Public Law 85-624
Mining Law of 1872	30 USC 21 et seq.
Mining in the Parks Act of 1976	Public Law 94-429
National Historic Preservation Act	Public Law 89-665
National Environmental Policy Act of 1969	Public Law 91-190
National Park System Organic Act	Public Law 64-235
Rivers and Harbors Act of 1899	33 USC 401-413
Wild and Scenic Rivers Act	Public Law 90-542
Wilderness Act	Public Law 88-577

Note: Most public laws listed have been amended.

Resource Protection Goal - The objective or goal for a target resource which the National Park Service is attempting to maintain or return to. It determines a management goal for the level of change from natural, premining conditions. Resource protection goals are applied in alternatives B and C. They are presented as a percentage of the premining conditions of a target resource in a study area. RPGs have only been set for target resources which are analyzed with the cumulative impact methodology.

Riparian Zone - A distinct vegetative community that occurs in the transition between the aquatic and upland communities, and is characterized by high species abundance, diversity, and productivity. It is associated with a high water table and is often dominated by willow species.

Scoping - An early step in the EIS process for determining the scope of issues to be addressed in the EIS. Other agencies and concerned publics are participants in these forums.

Scouring - Stream bed cutting which occurs during a relatively short period of time.

Settleable Solids - Suspended particulate material which precipitates from water in a fixed period of time. Usually measured as the volume of solids which settle from one liter of water in one hour.

Short-Term Effect - For the aquatic resources, the impact which occurs during active mining operations. For wildlife habitat resources, the effective habitat loss due to the displacement of animals during active mining operations (it is added to the past long-term disturbance so that it measures how much habitat is available for wildlife use).

Study Area - Contiguous watersheds containing claims with a likelihood of mining activity in the foreseeable future or major past mining disturbance. Study area boundaries differ between the aquatic and wildlife resources based on the zone of influence of mining activity on the resource.

Suspended Solids - Organic and inorganic particulate material mixed in water.

Target Resource - A major issue identified in scoping which was selected as an impact topic to be addressed in the EIS. Some target resources are analyzed quantitatively (with the cumulative impact methodology), and others are analyzed qualitatively.

Turbidity - Measure of water optical clarity. Optical clarity in water is affected by the scattering and absorption of light by suspended material such as clay, silt, organic and inorganic particulates, and plankton.

Unpatented Mining Claim - A parcel of mineral land for which a claimant has obtained a right to extract minerals, but full title has not been acquired from the Federal Government. It includes the subsurface estate and use of the surface for extractive purposes only.

Wetland - Those areas that are inundated or saturated by surface or groundwater at frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas (Clean Water Act of 1972 [P.L. 92-500]).

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